# Defense AT&L

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WSARA One Year Later

Commercial Acquisition Demystified

My Big, Slow Fail

The LOGCAP III to LOGCAP IV Transition

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Using Value Engineering to Reduce Life Cycle Cost

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All magazines undergo regular change to keep them fresh, and *Defense AT&L* is no exception. With this first issue of 2011, you'll notice some differences.

The major change is that in this issue, we don't have a cover interview. Our Defense Acquisition Leadership Series has run successfully since January 2004, and the magazine has interviewed many important men and women with critical messages and visions to share with the defense acquisition workforce. Leadership interviews aren't completely disappearing from *Defense AT&L*; they will simply not be a feature of every issue of the magazine.

Your responses to the survey that appears in many issues of the magazine and on the magazine's page on the Defense Acquisition University website told us what information you, our readers, would like to see in the magazine to help you do your jobs better. In the issues where we don't feature a leadership interview, we will be able to devote more space to articles addressing the topics you told us you wanted, and we can also give more authors the chance to share their expertise with you.

Another long-standing feature, "Surfing the Net," is missing from the print magazine. It is now part of our online-only content and is accessible from *Defense AT&L*'s page on the DAU website at <www.dau.mil/pubscats/pages/defenseatl.aspx>. Hotlinks in the online "Surfing" will take you directly to the agency site you wish to visit.

## Another Change: Defense AT&L Online

In part in response to Under Secretary Carter's call for cost-cutting measures and in part to be more green, *Defense AT&L* will be transitioning, later this year, to an online-only publication for individual subscribers. We will continue to print a smaller number of magazines for libraries, universities, organizations, and offices.

How will you know when a new issue of *Defense AT&L* has been released on the DAU website? We will notify you by e-mail, using a subscriber LISTSERV. In order to build the LISTSERV, we ask all readers to resubscribe by sending the e-mail address you'd like us to use to datlonline@dau.mil. Be ready for the transition—send your e-mail address today.

All of us here at *Defense AT&L* wish you a healthy and prosperous 2011 and look forward to hearing from you. Write to the managing editor at datl@dau.mil.

Judith Greig
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# WSARA One Year Later

*William R. Fast*

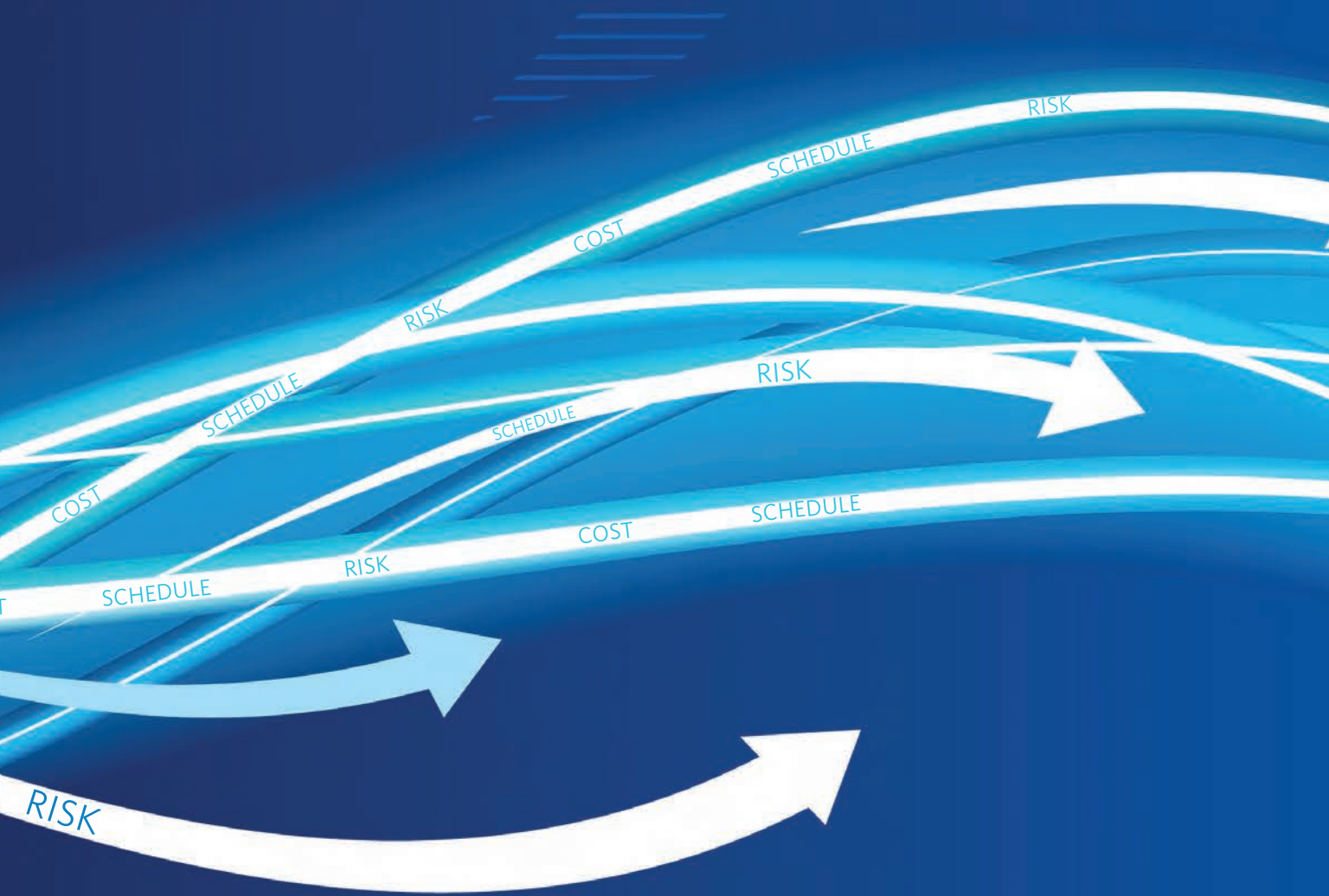



If the Weapon System Acquisition Reform Act of 2009 (WSARA, enacted May 22, 2009) is to have any lasting effect, the behaviors of the defense acquisition workforce must change. One of my major concerns is how we can better train our major defense acquisition program (MDAP) managers and support staffs in the practical application of the tenets or principles of WSARA, most of which are really not new; they just mean getting back to the basics of acquisition! This article addresses three key challenges of WSARA and outlines some actions we need to take to change the culture of our acquisition workers.

## Integrated Cost and Schedule Estimation

First, we need to adopt an integrated team approach to cost and schedule estimation. For too long, we have left cost estimation to the cost estimators. To further aggravate the situation, we outsourced many of our government cost estimators in the 1990s and are paying the price today. In the past, we have expected the cost estimators alone to do the business of cost estimation, yet we never told them all they needed to know in order to prepare a realistic cost estimate.

Then once we got their cost estimate, we pressed them to reduce the estimate to a more "affordable" number. We also hoped for new manufacturing processes and economies of scale that might keep the program affordable




(for example, the Joint Strike Fighter). Sometimes, we even threw out the cost estimate altogether and simply funded to available budget. Such was the case with the Army's Future Combat System when it entered development at Milestone B in 2003. Not a good way to start a program! According to Gene Porter in a December 2009 Institute for Defense Analyses paper entitled "The Major Causes of Cost Growth in Defense Acquisition," when that occurs, the entire decision-making process is put at risk, including both the original analysis of alternatives and the subsequent stability and executability of the program.

Cost and schedule estimation is a craft—a craft that requires reasoned inputs from systems engineers, logisticians, contracting officers, and testers, in addition to those of experienced cost estimators. It requires an integrated team of functional experts dedicated to identifying risk and assigning cost and schedule to that risk. Cost and schedule estimates cannot be done in a vacuum by a single estimator. It's a team sport in which multi-functional inputs are essential for success.

WSARA created the position of director of cost assessment and program evaluation in 2009. In addition to reviewing all component cost estimates and conducting an independent cost estimate for MDAPs, the director of cost assessment and program evaluation is to provide policies and procedures for all DoD cost estimates. That's a tall order, and one that can be achieved only if the grassroots acquisition workers make integrated cost and schedule estimation part of their day-to-day routine. That's because no policy or procedure can ever be written that will turn over all the technical and programmatic "rocks" under which cost and schedule risks lie in waiting. Our systems are just too complex. And even if it could be written, no policy or procedure has ever seen 100 percent compliance.

**If the Weapon System Acquisition Reform Act of 2009 is to have any lasting effect, the behaviors of the defense acquisition workforce must change.**

WSARA also requires the disclosure of the confidence levels for baseline estimates for MDAPs. Justification must be provided if the cost estimate is calculated at a confidence level less than 80 percent. Now, the law doesn't specify how confidence levels are calculated or explain why 80 percent is the target, as opposed to 90 percent or 70 percent. The intent of the law is to hedge against cost overruns.

Wouldn't we serve the same purpose if we used integrated cost and schedule estimation to uncover technical and programmatic risks and covered those risks at the beginning of the program to create more realistic cost and schedule estimates? Wouldn't risk-informed cost and schedule estimates be more easily defended through the budgeting process and to Congress?

The solution, from where I sit, is to teach and model integrated cost and schedule estimating to the grassroots acquisition workers. We have totally revamped our training for cost estimators and put them into their own career track, and we must not stop integrating cost and schedule estimation in our other acquisition courses. In addition, risk identification and management should become part of the curriculum so the acquisition worker can discover technical and programmatic risks and adjust cost and schedule estimates to mitigate them. I'll come back to that point later.

## Competitive Prototyping

Let's talk about the "art" of competitive prototyping. I call prototyping an art because it is part of a program's acquisition strategy. From my experience, acquisition strategy development is more of an art than a prescriptive science. I also know from teaching in the DAU PMT 352 program management office course that competitive prototyping is not well understood. In that course, students have to lay out a strategy for competitive prototyping prior to Milestone B. My experience is that we get all kinds of approaches, many of which reveal that students don't understand exactly what a developmental prototype is and how competitive prototyping might be used in the technology development phase prior to Milestone B.

For MDAPs, WSARA mandated competitive prototyping of systems or critical subsystems before Milestone B approval, unless waived by the milestone decision authority. Moreover, even if competitive prototyping is waived, a prototype must be produced before Milestone B.

Competitive prototyping isn't new to the Department of Defense. Even before WSARA, John Young, then-under secretary of defense for acquisition, technology and logistics, made it policy to have multiple competitive prototypes in order to determine the maturity of the technology and get a better cost estimate prior to Milestone B. Today, the Joint Air-Ground Missile, Joint Lightweight Tactical Vehicle, and Small Diameter Bomb II are examples of programs that seem to be using competitive prototyping with some success.

Yet there are also the failures—not failures in the sense of program failure, but failures in the sense that competitive prototyping really does not appear to have been cost-effective. Porter argues that the cost of developmental prototypes for the Joint Strike Fighter and Littoral Combat Ship only added to cost growth and may not have been worth the effort.

The concept of competitive prototyping is, indeed, new to many of today's acquisition workers because its use has been cyclical. The idea of prototyping aircraft engine and airframe combinations can be traced back some 20 years before World War II and was fairly common into the 1950s. A "fly-before-buy" strategy was instituted in the late 1960s by David Packard, then-deputy secretary of defense, but it fell out of favor by the late 1970s. Once again, the 1986 Packard Commission Report emphasized prototyping before full-scale development and this became part of DoD Instruction 5000.2 in 1987. However, both Porter and Jeffrey A. Drezner, author of a 1992 Rand Corporation research report, "The Nature and Role of Prototyping in Weapon System Development," point out that the nature of prototyping, the conditions under which one should prototype, and the benefits of prototyping remain unidentified.

Today's acquisition workers need to rethink and relearn competitive prototyping. They need to be trained on how to make a sound business case for competitive prototyping—if one actually exists. They need to think through how they will manage two or more contractors in a competition-sensitive environment. And—back to the cost estimating that I discussed earlier—they need to know how to convince decision makers in the programming and budgeting processes that

the additional cost of multiple prototypes is worth the funding. In addition, they need to understand advanced technology demonstrations and joint capability technology demonstrations that have long been in the domain of the science and technology community but should now be considered as viable prototyping approaches in the technology development phase.

Even more difficult for acquisition students to understand is how to compete at the critical subsystem level, as is permitted by WSARA. Full-up system prototypes are clearly impractical for big developments such as aircraft carriers and for one-of-a-kind satellites. Acquisition workers not only need to understand how to down-select from competing subsystem-level prototypes, but they also need to understand the on-ramp processes by which these winning components are integrated back into the larger system.

I advocate that case studies, written around programs that have used competitive prototypes (whether successful or unsuccessful) be injected into DAU program management certification courses. In addition, the PMT 352 program management office course should include a seminar on competitive prototyping just prior to the exercise in which students develop an acquisition strategy around competitive prototyping.

## Systems Engineering Decisions

Now let me turn to the third challenge of asking the right questions and making the tough systems engineering decisions, especially during preliminary and critical design reviews. As a quick review, the preliminary design review defines the allocated baseline for the weapon system, and according to WSARA, the preliminary design review (PDR) for MDAPs must come before the Milestone B decision review. Similarly, the critical design review defines the product baseline for the system and now separates the two major efforts of the engineering and manufacturing development phase: (1) integrated system design; and (2) systems capability and manufacturing process demonstration. Prior to WSARA, DoD Instruction 5000.02 raised the importance of these reviews by requiring post-PDR and post-critical design review assessments by the milestone decision authority, with decisions from those assessments documented in acquisition decision memoranda.

During the technology development phase, WSARA and DoD Instruction 5000.02 require that MDAPs conduct a system-level PDR: "A successful PDR will inform requirements trades; improve cost estimation; and identifies remaining design, integration, and manufacturing risks." The cost-performance trades that result from knowledge gained during competitive prototyping can help keep the program affordable and within the Milestone A component cost estimate. But are we teaching our acquisition workers what questions to ask at the PDR about design, integration and manufacturing risks? More important, are we really training them to make the tough decisions regarding cost and performance trades?

According to DoD Instruction 5000.02, "The project shall exit the technology development phase when an affordable program or increment of militarily useful capability has been identified; the technology and manufacturing processes for that program or increment have been assessed and demonstrated in a relevant environment; manufacturing risks have been identified; a system or increment can be developed for production in a short timeframe (normally less than five years for weapon systems); or, when the MDA decides to terminate the effort." That's a lot to ask! Are we really training the people who staff our pre-MDAP program offices to make those assessments and recommendations?

Too often in the past, programs have entered the engineering and manufacturing development phase without having demonstrated required technologies in a relevant environment, which is defined as technology readiness level (TRL) 6. In last year's class of Nunn-McCurdy-breaching programs, root cause analyses identified several bad actors. Porter reports that when the Army's Future Combat System entered system development and demonstration in 2003, 24 out of 31 of the identified critical technologies were at TRLs below 6. None of the 20 critical technologies was at TRL 6 when the Joint Tactical Radio Systems–Ground Mobile Radio entered system development and demonstration in 2002. The War-fighter Information Network–Tactical had only three of 12 critical technologies at TRL 6 when it entered systems development and demonstration in 2003 (Porter, p. 44).

WSARA now requires the director of defense research and engineering to conduct an independent assessment of the technological maturity and integration risk of the critical technologies of MDAPs. In addition, the DDRE is to develop knowledge-based standards to measure the technological maturity and integration risk of critical technologies at key stages in the acquisition process. In the past, the program manager was responsible for technology readiness assessments that were based upon definitions provided in the *Defense Acquisition Guidebook*.

Inadequacies in initial system design, systems engineering, and risk assessment at the front end of the program continue to translate into poor cost and schedule estimates (Porter, p. 45-46). We continue to shortchange early system engineering efforts in that critical timeframe between identification of the capability gap and Milestone B. In past acquisition workforce downsizing efforts, we got rid of key government engineers who shepherded the transition of new technologies into acquisition programs, so now we have lost their knowledge of how to assess technology readiness and manage technology transition risks.

We also do a poor job of estimating systemic risks inherent in the total system design. As we link systems to other systems, government program management office personnel need to better understand the integration and interoperability challenges. Case in point: We don't again want to get into a posi-

tion where we have to hire a lead systems integrator, as was the case with the Army's Future Combat System.

We need to teach our acquisition workers how early systems engineering design reviews can identify risks. We need to help them understand the risks associated with the integration of systems of systems. We need to lead them through case studies that demonstrate the value of early systems engineering and teach them some of the basic questions that need to be asked. We also need to train our people in the early decisions that must be made regarding which technologies are ready for the first increment of development and which technologies need to be deferred to later increments of capability.

We need to emphasize early systems engineering in our on-line fundamental and intermediate systems acquisition management courses. We also need to integrate more risk management training in *all* our acquisition courses. Currently, risk management is taught only as a targeted training event at the request of a program office or acquisition command. Much can be done to make our risk instruction more robust and to link it more clearly to early systems engineering.




Arnie, whose program held the 2010 record for cost overruns, is inducted into the Acquisition Hall of Shame.

## Institutionalizing WSARA

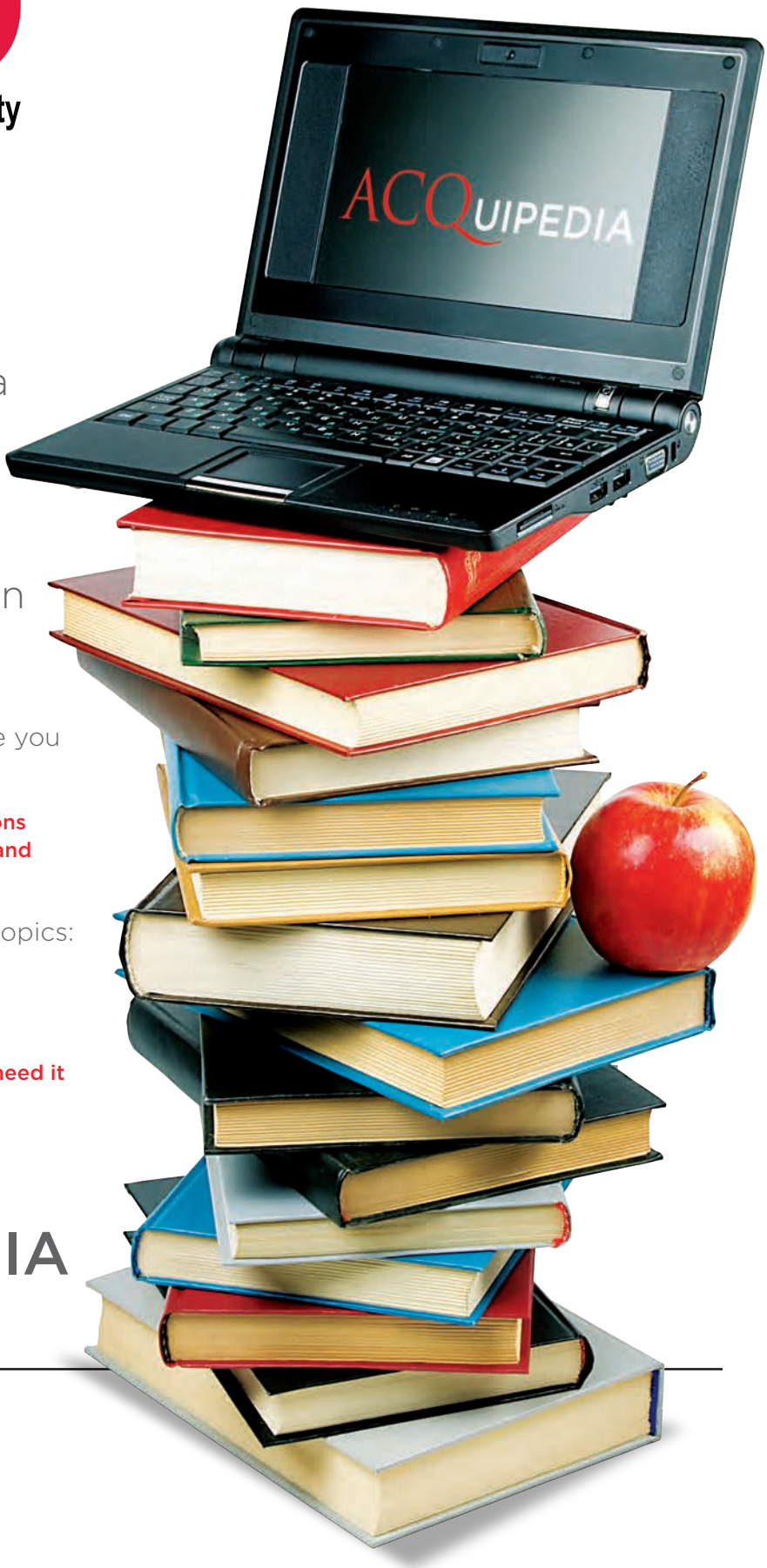
What will it take to really institutionalize WSARA? I feel strongly that changing the culture of the acquisition workforce requires that we change the way we teach and model the acquisition process. I've discussed three acquisition challenges to begin with as we seek to change behaviors and get back to basics. First, we need an integrated team approach to estimating cost and schedule. Cost and schedule estimation are not the responsibility of the cost estimator alone. Second, we must teach the art of competitive prototyping; we must rethink and relearn from the past and define the nature of prototyping, under what conditions one should prototype, and the benefits of prototyping. And third, we must help our acquisition workers ask the right questions and make the tough systems engineering decisions, especially during preliminary and critical design reviews. Those actions will go a long way in helping us understand programmatic and technical risks earlier.

**Fast** *teaches acquisition and program management courses at the Naval Postgraduate School. Prior to that, he taught in the program management office course at DAU. The author welcomes comments and questions and can be contacted at* **wrfast@nps.edu.**

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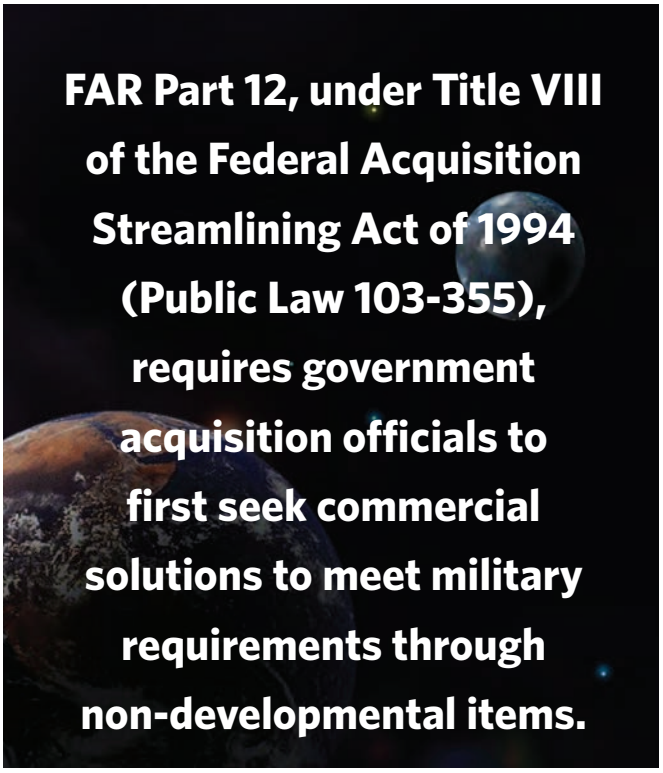
# Commercial Acquisition Demystified

## How Commercial Satellite Acquisition Conforms to FAR Part 12

*Eric K. Spittle ■ Brian P. Brodfuehrer ■ Michael J. Giomi ■ John Krieger*

Initiatives announced by Department of Defense Secretary Robert Gates in August 2010 to reduce overhead costs by more than $100 billion over the next five years will challenge the imagination, courage, and persistence of the nation's government-industry acquisition team to do its required share. What if, however, ways already existed to reduce cost but were not well understood? This article examines ways to decrease costs in commercial satellite acquisition and discusses five widely held myths regarding commercial satellite acquisition and manufacturing practices.






While the space domain is the focus, the information and approaches presented in this article apply to a wider range of acquisitions, where a reputable commercial industrial base exists as an alternative. The article also compares a typical commercial satellite contract with a contract based on the requirements of Federal Acquisition Regulation Part 12, "Acquisition of Commercial Items," and identifies the similarities as well as several differences that can be accommodated with the tailoring approach recommended by FAR Part 12. All of that is important to understanding the realities of commercial space acquisition and how readily commercial practices can be successfully adapted to meet required government FAR requirements.

## The Increasing Need for Space-Based Capabilities

According to an *Aerospace Power Journal* article by Air Force Col. Edward Mann, Desert Storm was the first information, or space, war. Since that conflict, space capabilities have taken on even greater importance in the battle to find and fight an elusive enemy. Focusing just on the satellite communications aspect of space, increased warfighter demand for higher-quality pictures, video, and responsiveness has led to a large demand for greater bandwidth and quality of service while, at the same time, acquisition budgets are forcing necessary compromises. The cancellation of the Transformational Satellite Communications System in 2009 left a significant hole in DoD's future communications architecture. It is likely that other acquisition domains (for example, cyber and unmanned aerial vehicles), are facing a similar situation where demand is fast outpacing current delivery capability.

Three general acquisition strategies could be used to fill the gap between bandwidth requirements and existing satellite assets. The first is a FAR Part 15 acquisition from a defense industrial base partner to purchase a satellite system; the second is to lease commercial satellite bandwidth; and the third is to purchase a satellite system from the commercial industrial base using a FAR Part 12 acquisition. The government has traditionally used the first and is already using the second by relying on commercial satellites to meet the rapidly growing need for communication with the battlefield. According to industry research firm Futron, the Defense Information Systems Agency leases as much as 80 percent of DoD's bandwidth in some geographic regions from commercial satellite operators.

The next step is the intelligent leveraging of commercial satellite production capability. It should be noted that in the president's National Space Policy of the United States of America, released in June 2010, the second foundational principle encourages a growing commercial space sector:

> A robust and competitive commercial space sector is vital to continued progress in space. The United States is committed to encouraging and facilitating the growth of a U.S. commercial space sector that supports U.S. needs, is globally competitive, and advances U.S. leadership in the generation of new markets and innovation-driven entrepreneurship.

That principle emphasizes the commercial industry as a source for meeting future DoD communications requirements. A commercial approach to augment the communications satellite programs of record remaining after the Transformational Satellite Communications System cancellation has an important place in the "more effective, efficient, cost-conscious way of doing business" articulated by Secretary Gates. Such an approach is entirely consistent with the existing FAR, specifically Part 12, which, under Title VIII of the Federal Acquisition Streamlining Act of 1994 (Public Law 103-355), requires government acquisition officials to first seek commercial solutions to meet military requirements through non-developmental items. Because commercial acquisition is part of the law governing DoD acquisitions, we should better understand what the commercial satellite industry offers within that context, and, for those in other product domains, what commercial acquisition opportunities are applicable.

## Five Commercial Satellite Acquisition Myths

To understand the real opportunities offered by the commercial satellite industry in meeting government needs, it is important to correct a few commonly held myths about commercial satellite acquisition practices.

***Myth 1: Commercial satellite acquisition processes do not require documentation deliverables.***

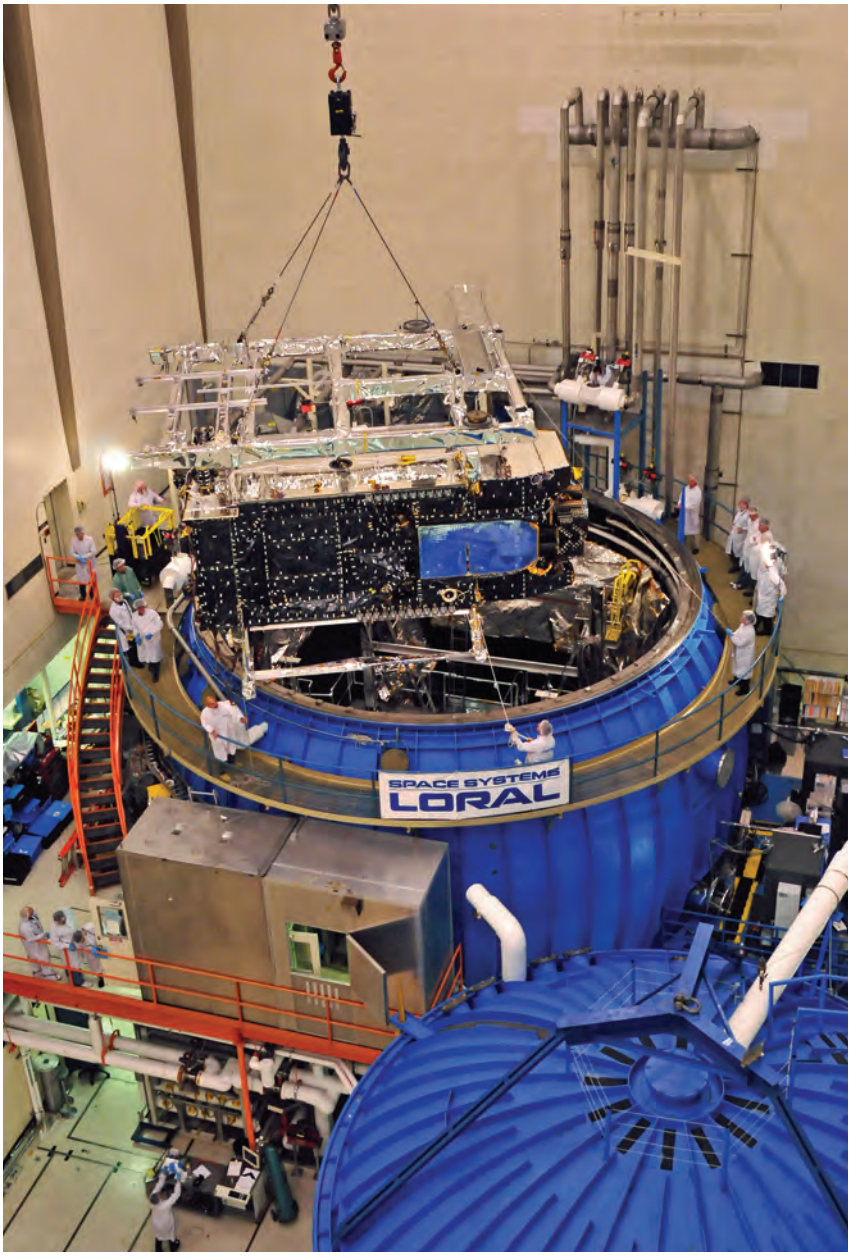
**False**. Just like government procurement agencies, commercial satellite owner/operators need to have high confidence that the quality and capability of their systems will meet mis-

sion requirements. Commercial acquisition/program management practices originally evolved from government acquisition practices and typically include comprehensive design reviews, detailed analyses, and extensive qualification and testing programs. Those are established, implemented, and controlled in conjunction with the customer and include extensive documentation regimes.

A typical commercial satellite contractor data requirements list shows 38 data items, of which 14 require customer approval. Examples of the items requiring customer approval are minutes and action items from the program readiness review, preliminary design review (PDR) and critical design review (CDR), satellite simulator specifications, in-orbit test reports, Class I waivers, deviations, and engineering change proposals. Such items demonstrate how closely the commercial contractor data requirements list mirrors those found in traditional FAR Part 15 acquisitions. A notional commercial contractor data requirements list, a reference to typical commercial contract terms and definitions, and an abbreviation and acronym list can be found at <http://ssloral.com/html/dau/reference_material.html>.

### *Myth 2: Commercial acquisition does not give the customer sufficient insight into program activities at the factory.*

**False**. Commercial acquisition and mission success are highly dependent on a collaborative relationship between the manufacturer and the customer, which begins at the preacquisition solicitation phase and continues throughout the satellite's active life on orbit. Immediately after contract award, a full-time customer program office is established at the contractor's manufacturing facility and will last for the duration of the program. Commercial programs typically run from 24 to 36 months. (Please note that the length of a program from contract award to launch depends on the amount of design development required; the amount and availability of hardware; and the complexity of assembly, integration, and test.)




ViaSat-1 is a broadband satellite that will provide more than 100 Gbps throughput. It is shown here being lifted into the thermal vacuum chamber at Space Systems/Loral.

Photographer: Brian Webber, Space Systems/Loral

Onsite program office teams vary in size from several to a couple of dozen engineers and managers, depending on the customer's familiarity with the manufacturer and the number of satellites concurrently under construction for them at the facility. The onsite teams have complete access to program data and facilities; and visibility into, and approval of, program activities. The onsite program office team reviews all documentation; is involved in all program reviews; and is included in all contractual buy-off events, including equipment qualification status reviews and part, material, and process activities. Important characteristics of the members of the onsite teams are their experience, knowledge, and authority to make decisions for their company so that critical programmatic schedules can be met.

### *Myth 3: Commercial satellite acquisition programs do not include PDRs or CDRs.*

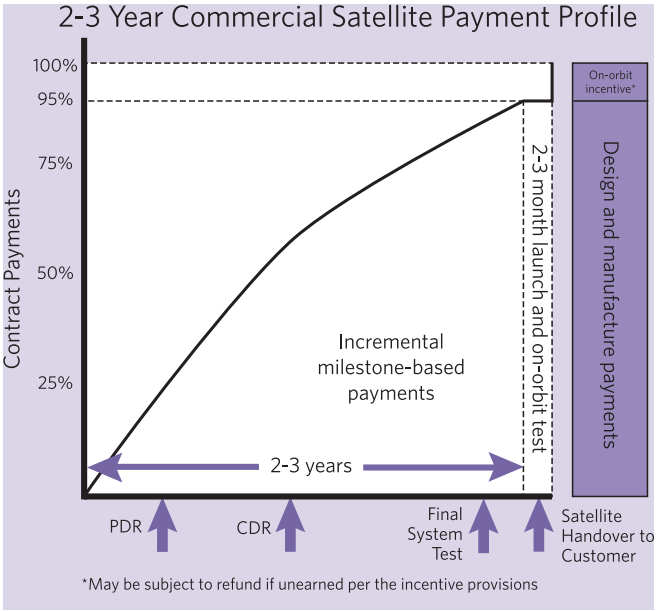
**False**. The standard practice of holding PDRs and CDRs in the commercial satellite industry is very consistent with gov-

ernment practices. A PDR is always held to establish the design feasibility of the satellite and its subsystems, including the payload and all associated ground control hardware and software. The manufacturer proceeds with detailed design activities once the customer approves PDR completion. The next major review is a CDR, which is conducted with the purpose of confirming and providing customer confidence that the satellite design, including all associated subsystems and equipment, meets the requirements of the technical specification. Upon the customer's approval of successful CDR completion, the contractor can proceed with the satellite manufacturing, assembly, integration, and testing activities.

Commercial design review requirements, as well as other practices, have evolved directly from government acquisition practices, and many of the professionals active in the commercial satellite industry today received their satellite program training and experience while working on government satellite acquisition programs. Assurance of mission success for the typical 15-year life of today's commercial communications satellites is not left to "trust me" metrics—the impressive record of commercial on-orbit performance bears witness to this.

### *Myth 4: Commercial satellite acquisition practices require customers to pay the full contract price at contract award, thereby losing any financial leverage with the manufacturer.*

**False**. Even with the significantly shorter schedules and lower prices associated with commercial satellite procurements, full payment in advance would be extremely unusual. Commercial satellite manufacturers develop program payment plans that attempt to maintain a cash positive/neutral position throughout the satellite design/build cycle. Because commercial satellite contracting involves, in almost all cases, fixed-price contracting, a milestone payment plan is typically incorporated into each contract. Unlike a calendar-based payment plan, a milestone plan requires fixed payments to be made upon successful completion of program events. The figure illustrates a few representative milestones that occur over the life cycle of a commercial satellite design and production cycle.




Typical Commercial Contract Milestones and Payment Plan Profile

The customer and contractor agree on the program payment events and associated payments at the time the contract is signed. It is typical for there to be one or more payment milestones identified in every planned month of the program. Milestones that demonstrate significant progress being made toward program completion are usually selected. Examples include:

- Completion of CDR
- Start of panel integration
- Start of thermal vacuum testing.

Invoicing is done no more than once per month, and only for the amounts associated with the payment milestones completed during the month. Time-phasing of program funding needs can vary because of factors such as amount of qualification required, availability of equipment and supply sources, complexity of the configuration, etc. As shown in the figure, however, it is not uncommon for 60 percent or more of the costs that are incurred on a commercial satellite program to be spent or committed within the first 12 to 15 months of the program.

### *Myth 5: Commercial satellite manufacturing means inferior quality.*

**False**. Competition in today's commercial satellite market demands the highest-quality products and services, and billions of people depend on the performance of the satellites every day. Globally, multi-billion dollar industries depend upon reliable commercial satellite performance, and decades of actual experience shows that commercial satellite manufacturers are building high-quality, reliable satellites that are meeting these needs.

Communications service providers buying commercial satellites expect greater than 99 percent availability, and the marketplace punishes poor performance and poor reliability. Failures reduce revenue and customer base, and they increase insurance premiums or result in insurance coverage exclusion. As a result, rigorous quality assurance policies, programs, and practices are instituted at all levels of the commercial satellite manufacturing enterprise to ensure best practices are implemented, maintained, and validated.

Satellites, even when they take maximum advantage of proven heritage designs and equipment, are still very sophisticated systems that demand extensive and effective control processes. Like their government contractor counterparts, commercial manufacturers maintain certified quality assurance programs, which are documented, staffed, and audited.




Other effective levers available to commercial customers to ensure the success of the satellite mission include the use of financial incentives. Typically, commercial customers incentivize success by requiring a portion of the satellite price, in the range of 10 percent, to be earned during the on-orbit operation of the satellite, so that earnings correlate to the performance of the satellite. The incentive can be paid as earned, or prepaid at acceptance and then refunded if unearned because of poor on-orbit performance. The earnings are dependent upon the satellite's meeting very specific operational performance criteria, usually transponder availability. This concept is also reflected in the figure.

## Commercial Contracts and FAR Part 12

With such common myths dispelled, FAR Part 12 can be used to enter into a productive partnership with a commercial industrial base partner. It is possible to make some very specific comparisons between FAR Part 12 and commercial satellite contracting.

Though the wording of required FAR terms may differ slightly from those contained in typical commercial satellite contracts (many of which are available for review through government Federal Communications Commission/Security and Exchange Commission databases) significant parallels exist between the two and a minor amount of tailoring is required to bridge any differences. A detailed table with specific tailoring provisions is available for review at <http://ssloral.com/html/dau/reference_material.html>.

Regarding the inspection and acceptance:

- Pre-intentional ignition—Acceptance testing will be done to government-approved test plans at the contractor's facility to demonstrate compliance with specification requirements, followed by a test review. Approval of acceptance testing by the government is a prerequisite for authorization to ship the satellite to the launch site; any discrepancies identified during acceptance testing/review must be corrected at the contractor's expense or waived by the government.
- Post-intentional ignition—Irrevocable acceptance of the satellite occurs at the conclusion of on-orbit testing; there is no right of rejection of the satellite after intentional ignition. For non-conformances discovered after intentional ignition, the remedies are limited to analysis of failure, software patches, revisions to operating procedures, loss of any incentives tied to post-intentional ignition performance, or insurance recovery.

Regarding warranties:

- Prior to intentional ignition, the contractor is responsible for correcting all non-conformances at no cost; after intentional ignition, the remedies are more limited.

Intentional ignition refers to the point in time when the satellite is integrated onto the launch vehicle and the command signal is sent to start the ignition sequence of the launch vehicle.

## Leveraging Commercial Satellite Manufacturing

Some of the most common myths regarding commercial contracting, at least commercial satellite contracting, are proven false by an examination of the facts and decades of experience with commercial systems. Commercially contracted satellite manufacturing offers a way for the government to reduce costs and close capability gaps. It already has a place in FAR Part 12, and the government is already filling much of its satellite needs through commercial satellite leases.

There is an opportunity to leverage the commercial satellite manufacturing industry in order to maintain the United States' leadership in space-based capability and to provide a better value to the taxpayer. It is likely that acquisition professionals from product domains other than space can also leverage the ideas in this article to reduce costs and close capability gaps. As Under Secretary of Defense Dr. Ashton B. Carter stated in a June 28, 2010, memo to DoD acquisition professionals: "We must therefore abandon inefficient practices accumulated during a period of budget growth and learn to manage defense dollars … [within a] framework for restoring affordability to defense."

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# My Big, Slow Fail

## A Comedy Of Errors

*Lt. Col. Dan Ward, USAF*

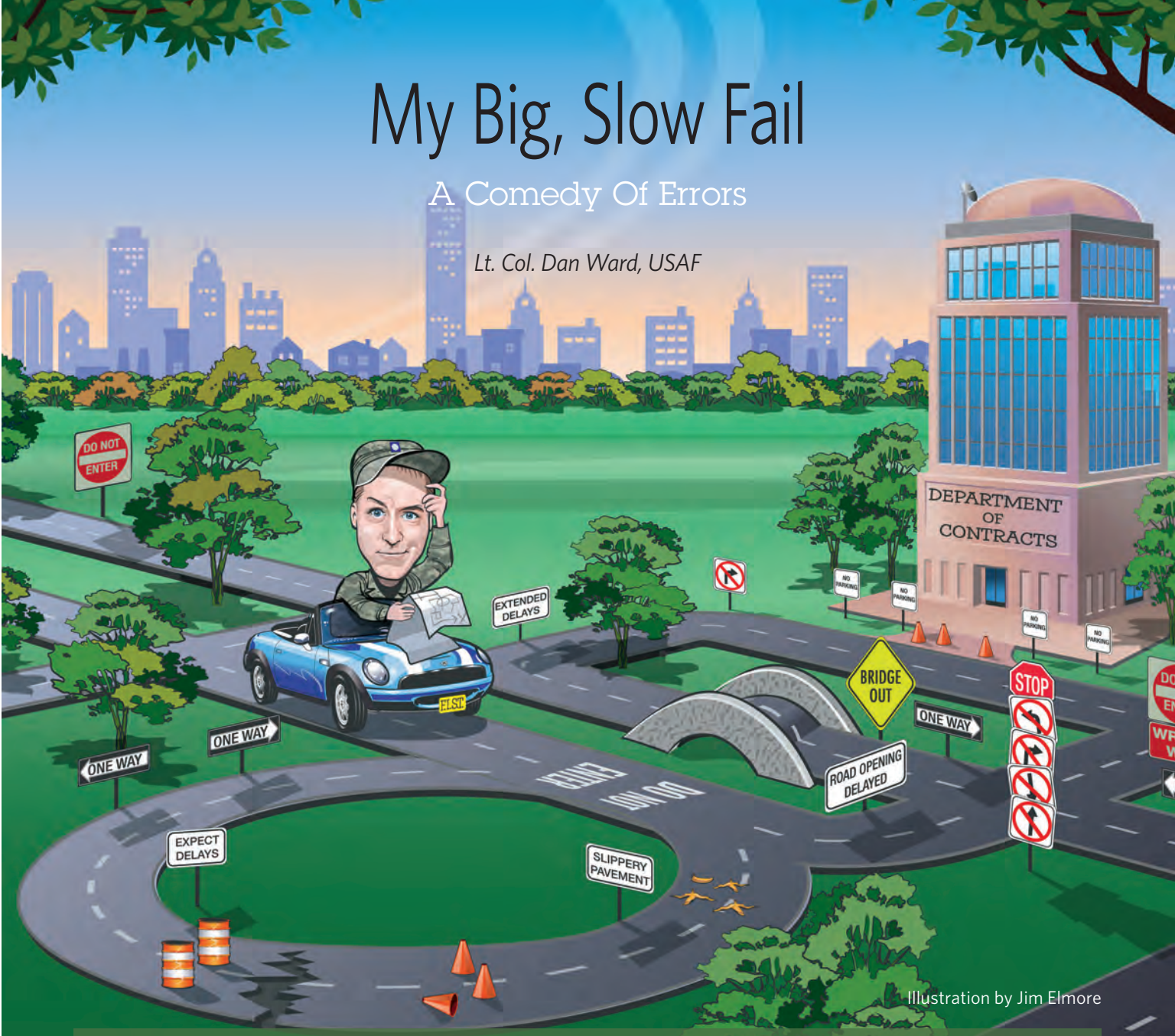



Illustration by Jim Elmore

"Oh, I almost forgot," said my soon-to-retire predecessor, as he prepared to hand his responsibilities over to me one sunny day in late July 2009. "This services contract you're taking over is about to expire. You'll need to set up a follow-on, but don't worry. Everything is pretty much set. It shouldn't take much effort."

He showed me a Justification & Approval (J&A) document, supporting the decision to award a sole-source contract to the incumbent. He also gave me a Performance Work Statement that explained all the work, and an Independent Government Cost Estimate (IGCE). All that remained, he said, was to cross a few t's, dot a few i's, and the work would continue uninterrupted. We expected to have the new contract signed by October, plenty of time before the original one ended on Dec. 31. I'm no contract expert, but this looked pretty easy to me.

Turns out, first impressions can be misleading.

## Just One More Thing

My frequent telephone conversations with the contracting officer (CO) over the next few weeks were quite positive. It looked like we'd need 60 days to award the contract, which sounded long but not outrageous. I was optimistic that we could be faster, but I figured there was wisdom in building in a little cushion. Better to under-promise and over-deliver, right? One nagging issue was that I seemed to uncover new stuff at every turn.

A typical phone call to the CO would go something like this: "We're in good shape … Oh, wait, the J&A needs to address this … and that … and this other thing." Or: "Turns out the market research isn't complete—I should've mentioned that sooner." Then there was, "Did I mention we need a program management plan?" You get the picture—and eventually so did I, although I was embarrassingly slow to act on it. I kept asking for a list of all the necessary tasks, documents, and reviews. And the list just kept on growing.

After playing several rounds of Just One More Thing, I finally did what I should have done much sooner: I visited the CO in person. I know, I know, failing to get face time right away is a rookie mistake. And yes, I have all sorts of excuses for not doing it sooner: It looked like things were lined up and ready to go; we talked on the phone all the time; our offices were on different sides of a big river with few bridges, and it seemed inefficient to spend half a day in transit for a one-hour meeting; and so on. But really there's no good reason for not making the trip. I should have known better.

## Over the River and Through the Traffic

Making the trek across the unnamed river was no mean feat in an area with notorious traffic and many one-way streets. But I managed to survive the bridge and the confusing road signs, and I located the contracting shop. It was now September.

The purpose of the meeting was to go over the contract plan from start to finish, highlighting all the necessary documents, reviews, and other required steps between now and awarding the contract. I kicked myself for the weeks I'd wasted and for overlooking the signs (obvious in hindsight) that there was more to this effort than met the eye. But I was there now, determined to get a solid game plan on paper. At this point it still looked like a 60-day effort.

When I met the CO in person for the first time, I also met his replacement … for the first time. We were going to start over in more ways than one. See, the J&A had been rejected. We were now looking at a full-and-open competition, which made the stack of required documents and reviews grow exponentially. So much for those few i's and t's.

Instead of the simple contract effort I'd been handed, I was now looking at a complex competition with a multi-award, indefinite-delivery, indefinite-quantity contract projected to go to several vendors. And instead of 60 days, the new estimate was seven months, a figure that triggered my gag reflex. This was an embarrassing development for a guy who's built a reputation advocating the FIST (Fast, Inexpensive, Simple, Tiny) approach to acquisitions.

During the meeting, the new CO sketched out all the necessary documents and reviews for me as requested, but he did so by hand on a piece of notebook paper. That was less impressive and professional than it sounds. As we walked down the list, we frequently jumped back up the page to add steps and documents that were overlooked in the first pass. That didn't increase my confidence. By the end of the meeting, having gone through the list several times and garnered multiple assurances that it was everything we'd need to do, I was satisfied the list was complete.

Clearly, I'm an idiot.

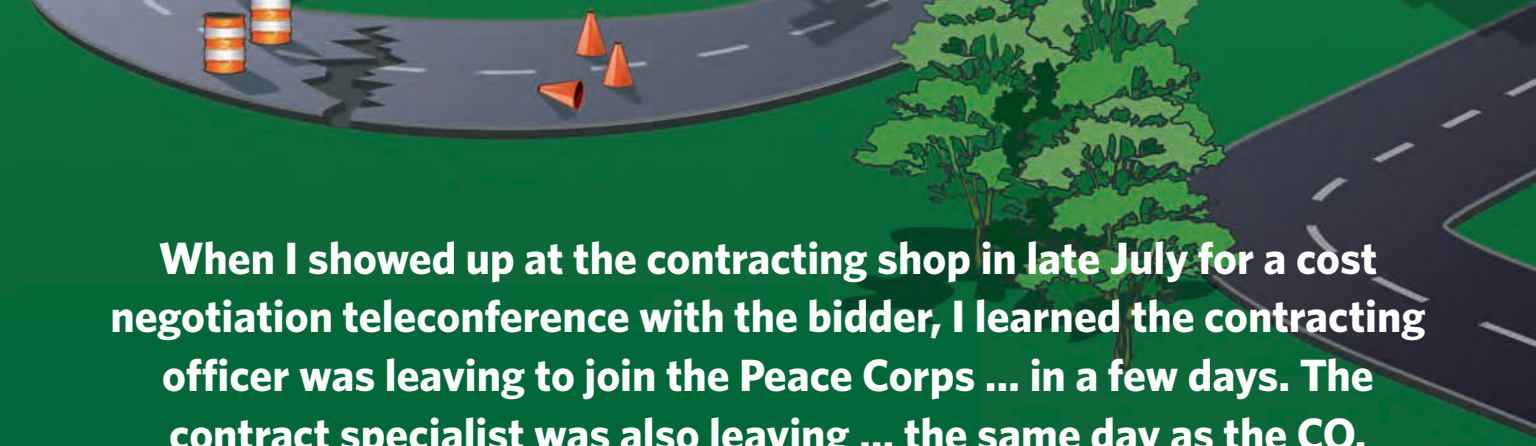
## Back to the Drawing Board

During the long drive back through the traffic and over the river to the office, I had plenty of time to think about my situation (in between alternating bouts of traffic-induced terror and traffic-induced boredom). I soon convinced myself a competition was a good thing, despite the seven-month timeline and the handwritten list of milestones.

See, I like competition. It tends to improve quality and reduce cost. I didn't like the seven-month estimate but figured we could find ways to trim that down once we dove in to the details. I knew I could do things faster than the CO expected and was pretty sure I could help the rest of the team do the same. I convinced myself an April award might not be so bad.

Immediately after that meeting I rewrote the Performance Work Statement, making it more explicit and specific. I started creating other documents and meeting more of the stakeholders. The CO and I worked our way through that handwritten list. We seemed to be making progress.

Then, in a fine display of initiative but a poor example of coordination, someone launched another round of market research but changed the North American Industry Classification System code on the query without consulting me. This meant every interested responder was the wrong kind of company and entirely unsuited to do the work, much to everyone's frustration. It also meant we lost more time



**When I showed up at the contracting shop in late July for a cost negotiation teleconference with the bidder, I learned the contracting officer was leaving to join the Peace Corps ... in a few days. The contract specialist was also leaving ... the same day as the CO.**

because we had to do the research over again. I eventually convinced the CO we needed *this* kind of company, not *that* kind of company. We did another round of market research, now with the original (i.e., correct) NAICS code. Would you believe we found only one responsible source? Yup, it was the incumbent.

You know what that means: We were not in a competitive environment after all. Time to revisit my predecessor's original J&A and scrap many of the competition-specific documents I'd just spent weeks writing. Meanwhile, the original 60-day window had long since come and gone.

We extended the period of performance for the active contract by another nine months, so the December deadline was no longer hanging over our heads. We had plenty of financial ceiling left for some reason, and now we had until the following September to award the new contract. That should be more than enough time, right?

## Snowed Under

Right around October, which attentive readers may recall was the original award date, I was introduced to a little thing called an acquisition strategy panel. The ASP is a big review where the CO and the program manager (that's me) present their strategy to a high-ranking decision maker. The ASP wasn't on any of the previous lists of Things To Do. I also got a big template to fill out, addressing all aspects of the effort, including documents, reviews, and requirements. "Gosh," I said to myself, "it would have been nice to see that template four months ago. I'm pretty sure it's exactly what I asked for at the first face-to-face."

We got to work preparing for the ASP. Because I'm the luckiest man in the world, the ASP was scheduled for the middle of December, which is when a huge snowstorm shut everything down for a week and forced us to reschedule. Then we bumped up against the holidays. The next available date wasn't until February, so there went another six weeks. The ASP itself went smoothly, and we got approval to proceed. Then Snowzilla came back and shut things down for another week. We lost what little momentum we had.

For the next seven weeks, I called the contracting shop multiple times per week and asked whether the J&A had been signed by the ASP chair. The answer was always the same: "Not yet, but we're working on it." Finally I contacted the ASP chair directly and immediately got a signed copy of the J&A in my inbox. It was dated seven weeks previously. I decided this was an appropriate time to practice saying all those words my mom always told me were inappropriate.

The J&A had apparently been sitting around, signed but undistributed, for almost two months. Why? I don't know, but I take full responsibility for being too patient, too polite, and too gullible. The important thing was that the document was signed and I had a copy. It was now late March.

With a signed J&A in hand, I tried to get it posted to <Fed BizOpps.com> for the obligatory review period. I was originally told it would need to be posted for two weeks. Then it looked like we could do it for three days. Hooray! With the usual CO out of the office, a backup CO posted it for three days, assuring me this was sufficient. But when the assigned CO returned, she reaffirmed that two weeks would indeed be necessary. Even worse, the previous three days wouldn't count towards those two weeks. One step forward, two weeks back.

Two weeks came and went. No interested parties responded to the J&A, so we were cleared to proceed. It was now June. Unable to reach the CO by phone, I sent a note asking how the final internal review was going. Imagine my surprise when I got an automated out-of-office email saying she was gone and would be out of the office for the next two weeks ... including the date scheduled for releasing the solicitation. Despite almost daily conversations about schedules and events, a two-week absence during a key milestone somehow went unmentioned. I can't tell you how happy that made me.

We ended up sending the solicitation a few days later than scheduled, but not before we played two more rounds of Just One More Thing. That's right, two days after the solicitation was supposed to be sent we discovered a necessary document was missing from the package. Two days after




that, we realized another piece was missing. Thankfully it doesn't snow in June here, otherwise I'm sure we'd have had another delay.

## Just One More Thing (Reprise)

Against all odds, things progressed. We received the proposal. We reviewed it. It looked fine. And then we got specific about the timeline for doing things like awarding the contract and starting work. That's when I was told we couldn't have two simultaneous contracts with the same company to do the same work. This meant that we could award the contract at any time during the summer, but the period of performance couldn't actually begin until Sept. 15, shortly before the current contract ended—unless I wanted to cancel the current contract "early" (I didn't). In the minds of almost everyone but me, this reduced the urgency to get the contract signed and awarded.

When I showed up at the contracting shop in late July for a cost negotiation teleconference with the bidder, I learned the CO was leaving to join the Peace Corps ... in a few days. The contract specialist was also leaving ... the same day as the CO. You can't make this stuff up. Replacements hadn't been identified yet, but office management promised everything would be ready to go before they left. Where have I heard that before?

A new team formed over the next few days. We got together immediately and put together an updated schedule with a contract award on Sept. 9. Would you believe that in late August, two weeks before the scheduled award, I learned the new contract specialist would leave in three days, after less than a month on the job? For those of you keeping track, that's four specialists in 12 months. And then the CO went out sick for two weeks.

I requested and received multiple assurances that the Sept. 9 award date would hold, despite the concurrent turnover and illness. My natural optimism stretched to the breaking point, but I didn't have much recourse. On Sept. 8, I was assured everything was on track to award. The next day, well, let's just say the pattern persisted.

Do I even need to say it? Things got delayed again, which surprised nobody, angered many, and made everyone nervous because the end of the fiscal year was almost upon us. The new award date was Sept. 17. I can hardly bring myself to write the next line but I'm afraid I must.

Late in the afternoon of Sept. 15, we managed to squeeze in another round of Just One More Thing.

Yup, six days after the contract was supposed to be awarded, I was told I'd need to fill out some new document I'd never heard of before and get it signed by a general officer, and we needed it before the contract could be awarded.

No problem. I got the letter signed in less than 36 hours. We had a few more delays and a few more requests for new information, but eventually we passed the final reviews. And then, on Sept. 23, 11 months later than the original date and six days after the "final" deadline, the contract was awarded. As the new fiscal year began, work transitioned from the original contract to the new one. Life went on. No funds expired. I took a day of leave. And so this story ends, not with a bang but a whimper.

Pastor Leon Hayduchok once told me, "If you reduce a story to a point, you'll miss the story." And so, rather than wrapping this all up into a pithy lesson like Aesop's Fables, I instead offer this story as, well, a story. It's something to read and reflect on. Possibly to commiserate over. Maybe to laugh at. Hopefully to learn from. But boiling it down to a few easy talking points simply wouldn't do it justice. I have an inkling of what this experience taught me; I'm sure you'll glean lessons of your own from this sad, sad tale. All that's left to say now is ... The End.

**Ward** *is the chief of acquisition innovation in the Acquisition Chief Process Office, Office of the Deputy Assistant Secretary of the Air Force for Acquisitions Integration. He holds degrees in systems engineering, electrical engineering, and engineering management. He is level III certified in SPRDE, level II in PM, and level I in T&E and IT. The author welcomes comments and questions and can be contacted at* **daniel.ward@pentagon.af.mil**.



# The LOGCAP III to LOGCAP IV Transition in Northern Afghanistan

## Contract Services Phase-in and Phase-out on a Grand Scale

*Lt. Col. Tommie J. Lucius, USA* ■ *Lt. Col. Mike Riley, USAF*

The U.S. military has successfully completed hundreds of Relief-in-Place and Transfers of Authority between military units during Operation Enduring Freedom and Operation Iraqi Freedom since 2002. The RIP/TOA process between military units has been observed, refined, and executed to the point where it is now a common and routine event. An uncommon and considerably larger-in-scale TOA was successfully completed in three key regions in Afghanistan: Regional Command-East, Regional Command-North, and Regional Command-Capital. This TOA was conducted between the Logistics Civil Augmentation Program (LOGCAP) III performing contractor (PC) and incumbent, KBR; and the LOGCAP IV incoming performing contractor (IPC), Fluor Intercontinental Incorporated. LOGCAP is a U.S. Army initiative to plan in peacetime for the use of civilian contractors in wartime and other contingencies. Army

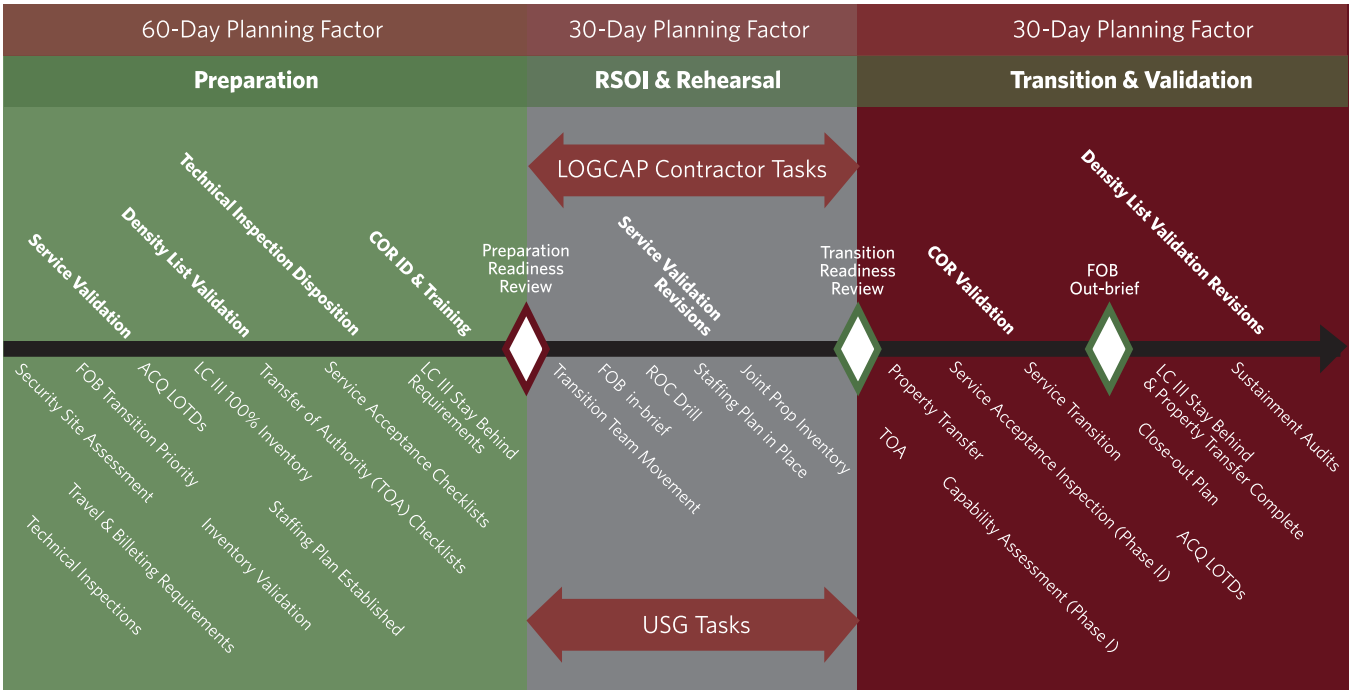
Materiel Command serves as the program manager for LOGCAP operations.

The transition of logistic contract support included 59 Forward Operating Bases (FOBs) with a combined supported population of over 70,000 military service members, coalition forces, and Department of Defense civilians and contractors, all geographically dispersed over an area slightly smaller than California. The transition involved over 12,000 combined prime contractor and subcontractor employees of KBR and Fluor, and it was completed in less than nine months. The task was complicated by the concurrent theater combat and force surge requirements. The Defense Contract Management Agency, the contract administrator for contingency contract administration services for LOGCAP, and DCMA's Team LOGCAP partners successfully planned and executed—arguably—the largest contractor battlefield RIP/TOA in military history.

## Planning and Development Begin

To appreciate the significance of this TOA, one must first understand the considerable impact LOGCAP has on operations in northern and central Afghanistan. In the northern half of Afghanistan, LOGCAP provides operations and maintenance to over 1,500 non-tactical vehicles, 1,800 generators, 7,500 facilities, and over 40 dining facilities providing over 4 million meals per month. Additionally, LOGCAP provides, on a monthly basis, over 42 million gallons of water and 19 million gallons of fuel, and processes over 150,000 bags of laundry. Afghanistan's austere infrastructure and hostile environment complicate this already challenging mission. The monumental task of planning and executing the contractor RIP/TOA—contractually referred to as phase-in and phase-out of services under the continuity of services clause—fell to DCMA-Northern Afghanistan (DCMA-NA), the organization responsible for LOGCAP contract administration in Regional Command-East, Regional Command-North, and Regional Command-Capital.

Planning development for the transition began in early 2009. Neither the LOGCAP III nor the LOGCAP IV contracts provided detailed contract direction on the phase-in and phase-out of services between PC and IPC. Agency-level strategic guidance promoted in-theater centralized planning and decentralized execution, encouraging significant teaming and cooperation among the various stakeholders involved in the transition. Considerable human and financial resource challenges and risks had to be mitigated and overcome with well-crafted plans of action. During mission analysis, DCMA-NA recognized a need for additional human resources. In response, DCMA HQ authorized three additional quality assurance representatives and three property specialists to the DCMA-NA team. DCMA-NA also committed seven additional members from its base human resource authorization towards the transition mission, while continuing to execute contract administration and oversight of LOGCAP and theater-wide contract administration of Joint Contracting Command–Iraq/Afghanistan contracts. The additional resources included the assignment of a field-grade officer with program management and contracting experience as the overall transition lead; three company-grade officers with quality assurance and program management experience serving as FOB transition leads; and a company-grade officer as transition operations officer to coordinate transition events and activities, assemble and analyze reports and data, and orchestrate meetings and coordination with the PC and IPC. Two additional DCMA employees supported the




Initial Transition Task Template

transition of Bagram Airfield, the largest joint military base in Afghanistan and the region's strategic hub.

### Three-Stage Process

The initial plan for transition incorporated three phases: (1) preparation; (2) reception, staging, onward movement and integration, and rehearsal; and (3) transition and validation. The three phases were marked by two decision points, each of which had several task requirements to be met before proceeding to the next phase (as illustrated in the figure on the previous page).

The preparation readiness review validated the readiness of the IPC and PC through the substantiated completion of required preparation tasks to move into the reception, staging, onward movement and integration, and rehearsal phase. The transition readiness review was a decision briefing for the approval or disapproval for DCMA-NA to proceed with the FOB transition. The review ensured that the incoming contractor had appropriate resources, processes, procedures, supplies, and equipment to meet LOGCAP IV requirements. Transition readiness review approval led to the TOA of the performing contractor with the incoming contractor. T-Day, the day when the incoming contractor formally assumes responsibility for all LOGCAP contract requirements on the FOB, marks the start of the validation phase. Shortly following T-Day, the DCMA transition team began service acceptance inspections using the same DCMA service examination checklist used by quality assurance representatives and contracting officer representative (CORs) during full performance of the contractor.

**The Defense Contract Management Agency, the contract administrator for contingency contract administration services for LOGCAP, and DCMA's Team LOGCAP partners successfully planned and executed—arguably—the largest contractor battlefield Relief-in-Place and Transfer of Authority in military history.**



The DCMA service examination checklist measures contractor performance against contract performance requirements. This initial examination serves as a quality inspection baseline for subsequent DCMA and COR audits and has two goals: to ensure the incoming contractor understands the performance standards; and to continue validation and refinement of the contractor's quality management system. The validation phase concluded with the FOB out-briefs, which not only summarized transition activities over the previous few weeks, but also served as a formal introduction or kickoff meeting between the new contractor's FOB management team, FOB leadership, CORs, and base operating support integrator (BOS-I, commonly known as FOB mayor). The FOB mayor is responsible for FOB operations and maintenance as well as FOB infrastructure and facility planning and management. Including the FOB leadership and mayor assured buy-in and fostered confidence in the transition process by demonstrating to them DCMA, Fluor, and KBR commitment to customer engagement.

DCMA-NA masterfully orchestrated this complex mission by directing the activities of four transition operations teams and two DoD contractors. DCMA-NA simultaneously used four independently operating transition teams consisting of a team lead, an Air Force captain, a DCMA quality assurance representative, and a DCMA property specialist. DCMA transition team operations included the following: engaging unit leadership at the FOBs to ensure the unit fully understood the transition process; monitoring property inventory performed by the two contractors; monitoring the technical assessment of facilities; evaluating the readiness of the IPC to perform required LOGCAP IV services; conducting daily in-process reviews (hot wash) with FOB stakeholders; and preparing briefings and assessments.

Transitions, or TOAs, between the performing contractor and incoming contractor were executed by FOB, meaning all service operations transitioned from the PC to the IPC at a specific date and time for that specific FOB. Bagram Airfield was the exception. Because of the sheer size of Bagram Airfield at the time of transition (a supported population of over 25,000), it was determined that transitioning by service group (for example, black and gray water removal, vehicle maintenance, and so on) was a more rational approach. A unique challenge occurred during the transition, when the IPC and the PC became dependent on each other for support and services. Since the entire region and associated services were not transitioned on one overarching specific date, it was inevitable that at some point, the two contractors would have to support each other. For example, on Bagram Airfield, black and gray water removal transitioned to the incoming contractor while vehicle maintenance had yet to transition; therefore, the incoming contractor depended on the performing contractor for vehicle mainte-



**Emerging from the synchronization conference was a refined, more robust process with increased system fidelity, ultimately reducing transition timelines with no OEF mission impact and minimal impact to the continuation of FOB services.**

nance on the black and gray water removal trucks. A similar challenge occurred for individual FOBs. Although all services on the FOB transitioned to the IPC on a certain date and at a certain time, many of the FOBs—specifically the smaller population FOBs—encountered contractor interdependence because of hub and spoke support requirements. Decentralized execution allowed the IPC and PC, through DCMA-NA transition operations, to coordinate a change in transition order where the performing contractor maintained control over the hub FOB until the spoke FOBs transitioned to the incoming contractor. This reduced the risk of supply chain distribution problems that could possibly disrupt operations at the smaller FOBs. Once all spoke FOBs were under the IPC's control, the hub FOB could transition.

There were several important adjustments that contributed significantly to the success of the transition mission in northern Afghanistan. First and foremost was the decision to commit additional human resources and to appropriately devote those resources to the transition mission. However, the most critical event was the DCMA-NA commander's decision to convene an operational pause two months into the transition mission. The DCMA-NA transition team, IPC, and PC used the operational pause to hold a series of meetings with the various stakeholders to deal with and discuss observations, insights, and lessons noted during transition operations; and to address Army Materiel Command's directive to accelerate transition completion by two months. The transition operational pause culminated in a synchronization conference.

The initial transition plan was working but had some recognized shortcomings, including an incorrect assumption that all services were of equal importance and that the PC and IPC had 12 months to complete the transition. The current plan was unlikely to meet the Army Materiel Command-directed timeline and mission directives. Emerging from the synchronization conference was a refined, more robust process with increased system fidelity, ultimately reducing transition timelines with no Operation Enduring Freedom mission impact and minimal impact to the continuation of FOB services. A new four-step approach was adopted. It enhanced coordination and planning between DCMA, Fluor, and KBR and gave the FOB transition teams the authority to make proactive and continuous process improvements. Dedicated teams from Fluor and KBR were assigned to each step of the four-step approach.

***Step 1***

Activities during Step 1 are similar to those conducted during the pre-deployment site survey, setting and establishing the conditions for success. The incoming contractor conducts an FOB site assessment and conducts in-process planning on the resources required to transition and operate the FOB. The incoming contractor's presence at the FOB at this time is not permanent and is used to gain more detailed information to effectively implement movement of the transition activities toward full performance. During this phase, the DCMA transition team validates service requirements from LOGCAP III to LOGCAP IV coordinating with the LOGCAP support officer, FOB leadership, FOB mayor, and the FOB's supporting administrative contracting officer and quality assurance representatives.

***Step 2***

The incoming contractor begins a sustained presence at the FOB during this step, a phase similar to the activities of torch-and-advance parties. Early establishment of communications is critical at this time to set the conditions for subsequent service establishment, particularly in property/materials management and service order functions, for the IPC automated information system. DCMA completes its validation of services and contractor property accountability lists. The mayor identifies applicable CORs for services. As part of continuous process improvement the incoming contractor, performing contractor, and DCMA transition teams identified the need to start the asset inventory (property, facilities, materials, tools, etc.) during this step for FOBs with significantly large inventories and to supply support activity operations. These FOBs were usually designated as logistical hubs, supporting neighboring FOBs. The asset inventory is normally the critical path to meeting the scheduled transition day. This phase culminates at the preparation readiness review where the IPC and PC update DCMA on the finalized plan for transitioning LOGCAP service and operation requirements between the PC and the IPC.

***Step 3***

This step involves unit tasks similar to those performed when a unit completes theater arrival activities before assuming mission responsibility from the departing unit. Asset inven-

tory is started during this step, unless previously begun in Step 2. The essential service threshold prioritizes work during Step 3 and defines the minimum, or threshold, service requirements that must be reached before the incoming contractor assumes responsibility for LOGCAP operations of the FOB. Essential services are those services designated by contract as critical to life support on base—water, food, power generation, etc. The incoming contractor's readiness or capability is measured through capability assessment/TOA checklists developed by DCMA quality assurance representatives and based on the LOGCAP quality assurance and surveillance plan and the IPC's quality control plan, and are briefed at the technical readiness review. This phase culminates on T-Day or TOA.

### *Step 4*

T-Day marks the beginning of Step 4 and is very similar to the initial plan's validation phase, starting with DCMA's service acceptance inspections. The contractor's Phase 3 team departs and moves to the next FOB and hands off performance to the FOB contractor support staff. The contractor's Step 4 team focus is on training and integrating employees, refining automated information system inputs, and validating quality assurance processes. The DCMA transition team conducts a close-out brief with the mayor and FOB leadership giving a summary of the service acceptance inspection findings. Using the DCMA transition team's findings from TOA checklists, the transition team's observations, and the contractor's internal quality performance assessments, Phase 4 completes the transition effort and advances into contractor full performance.

## Ingredients for Transition Success

Early in-theater centralized planning and decentralized execution encouraged significant teaming and cooperation among the various stakeholders involved in the LOGCAP III to LOGCAP IV transition. The four-step process improved alignment and prioritization of transition tasks. Fluor's, KBR's, and DCMA's assignment of dedicated teams for transition activities proved critical in developing increased teaming between the contractors and contract administrator. This teaming approach also supported continuous process improvement of transition activities, where observations, insights, and lessons could immediately be applied in a decentralized manner. Developing and adjusting the transition approach to closely follow the proven RIP/TOA process and assigning the appropriate resources to that process led to transition success and ensured uninterrupted logistic support for U.S. and coalition forces in northern Afghanistan.

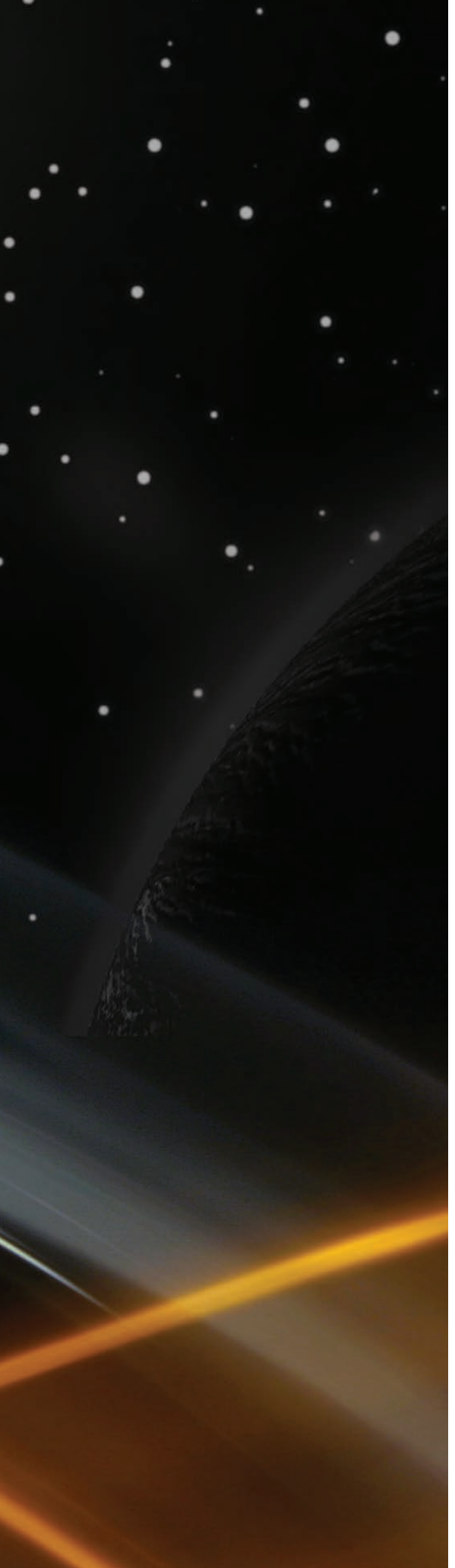
**Lucius** *was previously deputy commander, DCMA-Northern Afghanistan overseeing the LOGCAP III to LOGCAP IV transition activities.* **Riley** *is commander of DCMA AIMO-Birmingham and was the commander of DCMA Northern Afghanistan at the time of the LOGCAP III to IV transition. The authors welcome comments and questions and can be contacted at* **tommie.lucius@us.army.mil** *and* **mike.riley@dcma.mil**.





# What Exactly is Space Logistics?

*James C. Breidenbach*



The realm of space has been dramatized and glamorized in popular books, television series, movies, and video games. Such phrases as "the final frontier" (from the opening lines of *Star Trek*) or "the ultimate high ground" (from Department of Defense and Air Force space doctrine documents) appeal to the adventurous side of our human spirit. On the other hand, the word "logistics" usually brings to mind very unglamorous and perhaps mundane aspects of our lives: miles-long trains of coal-filled hopper cars on our nation's railway system, semi-trailer trucks hauling freight on the interstate highway system, or ships carrying containers of goods across the oceans. It might even include the service department of your auto dealer, if maintenance and repair are part of your concept of logistics.

You may have seen information on the space shuttle in the news and have inferred by now that resupply missions to the International Space Station, Hubble Space Telescope repair missions, and satellite deployment missions are space logistics—and you would be technically correct. The science of logistics as applied to our military space systems, however, is simultaneously very much like, and very different from, the examples of logistics given in the previous paragraph.

## The Ultimate High Ground

Our national military space systems consist of satellites orbiting the earth (the space segment); ground-based systems to monitor and command the satellites (the control segment); various types of equipment to employ the capabilities of the satellites in orbit (the terminal, or user, segment); launch vehicles that carry satellites to orbit (the launch segment); and extensive launch-range systems to support those critical minutes that make the difference between success and failure—a failure that could result in years of effort and billions of tax dollars ending up as junk on the sea floor instead of a valuable asset orbiting the earth. These space systems—the satellites, their control systems, and the terminals/user equipment—provide unique and critical capabilities to our country's leadership and military forces in the form of navigational data and time references, global communications, weather data and forecasts, and surveillance information. Logistics planning is crucial during system design and development to ensure that each system can be supported throughout its operational life. Logistics activities following launch/deployment and operational acceptance—also referred to as product support activities and sustainment—are critical efforts carried out to preserve the significant taxpayer investment in these national assets (hundreds of millions of dollars to over $1 billion per satellite), and assure worldwide warfighter

**Logistics**—The science of planning and carrying out the movement and maintenance of forces. In its most comprehensive sense, those aspects of military operations that deal with:

a. design and development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposition of materiel;
b. movement, evacuation, and hospitalization of personnel;
c. acquisition or construction, maintenance, operation, and disposition of facilities; and
d. acquisition or furnishing of services.

Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, April 12, 2001 (as amended through June 13, 2007).

access to the essential information and capabilities provided from "the ultimate high ground."

## The Logistics of Space

Logistics planning and product support take very different forms for each segment of a space system. We'll start with the space segment, which is composed of the satellites that are out of reach after launch and can be "touched" only by sending commands and receiving telemetry data via radio frequency signals. Satellites operate in the vacuum of space in temperatures ranging from minus 150 degrees Celsius to more than 120 degrees Celsius (minus 240 degrees Fahrenheit to more than 250 degrees Fahrenheit). They must be extremely reliable; and they must carry lifetime "spares" in the form of redundant components that can be switched to replace failed components, either automatically or upon command from the ground. They must also carry on board their lifetime fuel to perform maneuvers necessary to move from one orbital location to another and to avoid colliding with other satellites or debris. Satellites must generate their own electrical power (typically using solar panels) in order to provide power to the satellite subsystems as well as to the payload that provides the warfighter capability.

Satellites are seldom built in a true production-line manner, so there may be significant configuration differences from one satellite to the next, even if they are functionally equivalent. From a vantage point in space hundreds to thousands of miles above the Earth, a single satellite can "see" 20 to 30 percent of the Earth's surface, so a small number of satellites typically covers the entire Earth. A relatively large satellite system, such as the Global Positioning System, has 25 to 30 operational satellites at any given time; while a smaller satellite system, such as the Wideband Global Satellite Communications System, can provide worldwide coverage (except for the polar regions) with as few as five satellites.

During the development of a space segment, logistics activities focus on design reliability and other factors that contribute directly to the highest levels of mission capability and the shortest periods of downtime. The primary satellite sustainment efforts are technical in nature: engineering analyses of telemetry data to assess and forecast satellite health; software and data adaptations to compensate for satellite component aging, failures, and mission changes; and maintenance/upgrade of the ground-based satellite simulation environment to support analysis efforts and to provide a significant risk-reducing test and verification capability. Most military systems experience 70 to 80 percent of the life cycle cost during sustainment. For satellites, however, the inverse is frequently true: 70 to 80 percent of the life cycle cost is required just to build the satellites and launch them into orbit.

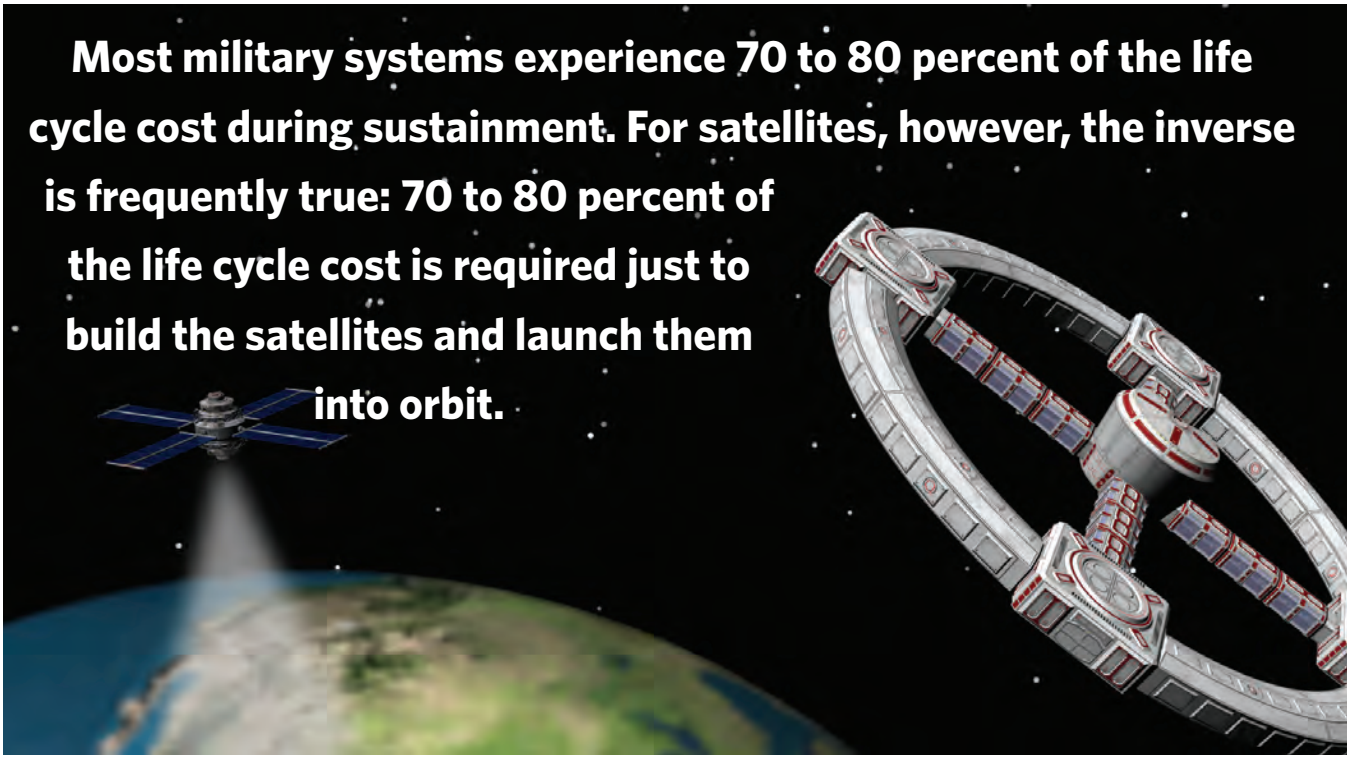
## The Logistics of Control

The control segment consists of commercial off-the-shelf (COTS) computer workstations, specialized equipment to format satellite command codes and translate satellite telemetry, and a worldwide networked family of tracking stations (the Air Force Satellite Control Network, or AFSCN) with large dish antennas and radio frequency equipment to communicate with satellites in orbit. Some space systems also have a second control system to allow command and control of the satellite payload separately from the "flying" of the satellite, or to facilitate mobile command and control outside the fixed AFSCN infrastructure.

Satellite command and control activities are typically grouped together at one or two specific nodes of the AFSCN, and each satellite system may have only six to 20 strings of equipment located at a site. Logistics activities during development focus on reliability but also pay attention to security and maintainability as well as design factors intended to minimize the impacts of COTS obsolescence on life cycle cost. The primary control segment sustainment efforts are, like those for the space segment, predominantly technical in nature. The original equipment manufacturer support life cycle of COTS software is a primary driver of effort and cost, typically rendering the highly reliable COTS hardware obsolete long before it fails; and requiring significant integration, test, and verification efforts every three to five years to follow the commercial baseline, thereby maintaining system certification and accreditation. The control segment life cycle cost is typically split roughly 50-50 between development and sustainment.

## The Logistics of Terminals

The terminal or user segment consists of various types of equipment to employ the capabilities of the satellite payloads on orbit. There is radio frequency equipment to receive signals from the payload, and sometimes a transmitter to send signals to or through the payload to another receiver. There is also, typically, processing and display equipment (most often COTS




computer workstations), and there may be additional equipment to send processed payload information to other users or to link other users into a satellite terminal. Most terminal and user equipment is located with warfighters (both in garrison and deployed); is produced in larger quantities (hundreds to thousands of units); and has characteristics similar to other communications-electronics equipment.

Logistics activities during development focus on the traditional reliability-maintainability-supportability factors applied to other communications-electronics items. The primary sustainment efforts are likewise more oriented to maintenance and repair than with the space or control segments. The life cycle cost of most operational terminal and user equipment is closer to that of other military systems: approximately 20 to 30 percent for design, development, and production; and the remaining 70 to 80 percent for sustainment. Because of the increasing use of COTS software and hardware, however, the commercial life cycle is becoming a more dominant factor in cost distribution throughout the life cycle. Larger production quantities and schedules result in fielding some equipment that is commercially obsolete as a result of the three- to five-year commercial obsolescence cycle, or drive the requirement for a software rehost/operating system update concurrent with production and fielding. The resultant effect on life cycle cost distribution is not well quantified at this time.

## The Logistics of Launch

The launch segment consists of the rocket vehicles that carry satellites from the Earth's surface into orbit. The launch vehicles are highly complex systems that must demonstrate extremely high reliability during their relatively short (minutes to hours) operational life. The Saturn launch vehicle used to transport astronauts to the moon in the late 1960s and early 1970s had to exhibit more than a 99.9 percent reliability—a 1 percent failure rate would have meant that approximately 1,000 components had failed, dooming a mission and imperiling the lives of the astronauts. Logistics activities during development focus on reliability, redundancy (where required), and safety. Launch vehicles are not typically stored or sustained in a conventional sense. When storage and reactivation are required, a specialized engineering activity is applied, involving significant non-destructive inspection and exhaustive testing to provide the needed mission assurance and safety.

Extensive launch range systems support critical satellite launch activities, primarily from Cape Canaveral, Fla., and Vandenberg Air Force Base, Calif. The launch range systems are loosely integrated, highly coupled collections of one-of-a-kind radar and optical tracking systems, safety and destruct systems, voice and data communications systems, and weather systems. The systems are necessary to manage the critical minutes when thousands of discrete factors must be monitored, measured, assessed, and reported to support split-second decisions that could successfully place a billion-dollar satellite in orbit, send it to the sea floor as useless junk, or leave it in a useless orbit where it will become a collision hazard to other satellites.

The current systems came into being and evolved over the last 50-plus years as NASA, DoD, and commercial space launch customers brought individual requirements to the table; there was no single, focused development program for those systems of systems. The two ranges in Florida and California differ significantly in overall configuration as well as in the compo-

nent systems that provide specific capabilities. The primary sustainment efforts are split between reverse engineering and remanufacturing failed one-of-a-kind assemblies, subsystems, and components; analyzing security issues at all levels and re-engineering/modifying systems as required to support certification and accreditation; and struggling to balance maintenance and repair requirements with modernization efforts—all competing for the same scarce budget dollars.

## Assuring Bang for Our Buck

The United States' military space systems, with the exception of terminals and user equipment, are low-density, high-demand systems. The subsystems and components are rarely produced in production quantities, and are frequently one-of-a-kind configurations. Logistics planning and product support activities tend to be more technically focused, with systems and software engineering dominating more traditional maintenance and repair. Even with these differences, however, the fundamental logistics planning and product support processes continue to be both relevant and necessary to assure that our space systems are reliable and supportable, meet the needs of our national leaders and warfighters on the battlefield, and return the best bang for the taxpayers' buck—the ultimate measures of all logistics.

**Breidenbach** *is the chief of logistics and systems sustainment manager of the Air Force military satellite communications portfolio of 20 ACAT and sustainment programs. A former Air Force officer, he is DAWIA level III certified in both life cycle logistics and systems planning, research, development and engineering (SPRDE). The author welcomes comments and questions and can be contacted at* **james.breidenbach@peterson.af.mil**.

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# Using Value Engineering to Reduce Life Cycle Cost

*Mark S. Benstin ■ David P. Benston ■ Scott S. Haraburda*



The Department of Defense has several initiatives to become better stewards of taxpayer dollars, and perhaps none have a greater reach than the drive to reduce total ownership cost. Rather than focus on specific activities or phases, reducing total ownership cost is a life cycle effort. Value engineering (VE) is a best practice process for supporting cost reduction in all phases of a system's life cycle.

VE is defined as "a systematic effort directed at analyzing the functional requirements of DoD systems, equipment, facilities, procedures, and supplies for the purpose of achieving the essential functions at the lowest total cost, consistent with the needed performance, safety, reliability, quality, and maintainability," according to DoD Handbook 4245.8-H, *Value Engineering*. Public Law 104-106 requires all government agencies to establish and maintain VE procedures and processes. The Federal Acquisition Regulation requires a VE clause to be included in all contracts exceeding a specified threshold. DoD objectives state its net savings and cost avoidances for VE will be at least 1.5 percent of the total obligation authority.

The VE process is typically conducted in eight phases: orientation, information, functional analysis, creative, evaluation, development, presentation, and implementation. Although the greatest potential for cost control when applying VE exists in the research and development stage of a new capability, opportunities for the application of VE techniques exist in every stage, especially when considering new available technologies and the experience of actual system deployment and user feedback. There are times when a problem in reliability or maintenance may become the greatest opportunity.

Crane Army Ammunition Activity recently used VE principles to great success in a cooperative joint redevelopment with the Naval Surface Warfare Center. CAAA is co-located with Code WXR, the Navy design agent for countermeasure flares, at the NSWC installation at Crane, Ind. The effort turned unusable inventory into good materiel, supporting the warfighter, saving dollars, and easing the environmental impact of the flares.

**A total cost savings of about $7.8 million was realized while meeting the warfighter's needs.**

## The Requirement

Mobile jettison units 32B and 38B are decoy flares the U.S. Navy uses in several types of helicopters and fixed-wing aircraft to promote the survivability of warfighters and airframes in hostile environments. Because of the critical nature of the system, there are strict reliability protocols for testing during production and final article lot acceptance. Once a production lot has received final acceptance, the flares are placed into a quality surveillance program. The Navy had a requirement for the flares to be shipped from the existing inventory.

## Orientation Phase

At the start of any VE effort, stakeholders are informed of the issues, with a focus upon identification of the problem or challenge. If there are multiple issues, priorities may be established. Scope is also of concern at this point, as a scope that is too narrow may leave potential areas for gain unexplored, while a too-broad scope may force the team to devolve into a new design effort in an attempt to reinvent the wheel.

The CAAA team took a close look at the requirement. The decoy flares consist of an igniter system that fires upon deployment, causing the main body (the grain) of the countermeasure to burn and create an intense heat source. This source disrupts the target acquisition and tracking system of the hostile missile. The stockpile of flares stored at CAAA had been produced by a private contractor and were reviewed through quality surveillance testing. Ignition issues were found in test samples, and further analysis revealed a very high failure rate.

## Information Phase

In a VE effort, team performance can be improved by setting ground rules to guide the working relationship and environment. The scope may be refined as more information is gathered. The main thrust of this phase is to establish the facts surrounding the VE effort as they are presently known. Procedural challenges at this point may include overcoming institutional inertia ("that's how we've always done it"); separating facts from opinions; and discouraging that time-honored creativity crusher—the immediate leap to solution.

As part of the failure analysis in our example case, Code WXR asked CAAA to examine a few of the flares and look for potential sources of the high failure rate. The request was a normal problem-solving technique; and thus, the analysis was not recognized as a potential VE project at that point. CAAA began to look for causality in an effort to reduce any possible recurrence of similar problems in future production.

## Functional Analysis Phase

While it is tempting to start with an analysis of the existing design, the true worth of VE begins at the most basic level possible. "What is this supposed to do?" is a great starting point. If we are looking at a vehicle, the most basic function might be to transport people or materiel. We can then begin to look at must-have requirements and develop an awareness of options and functionality that may have been added to the specification and go beyond the system need. This base analysis always yields some obvious pruning material.

The primary benefit of VE involves developing the most cost-effective way to fulfill the core requirements without jeopardizing performance. After the base functionality is defined, other characteristics can be provided by determining the "hows." How will it transport people? How many people? That may lead to answers such as "by ground" and "eight seated people." Each succeeding level helps to further refine the need, yet not define the solution. The team can then evaluate those functional areas to determine the most promising areas for the VE effort.



A U.S. Navy CH-53E Super Stallion tests the MJU-32A/B flare over the White Sands Missile Range. U.S. Navy photograph

With a mature system in sustainment phase, VE opportunities most often lie in maintenance and upgrade efforts. Regarding the CAAA VE effort, the flare itself was one component in a widely deployed defensive system. The primary focus was on the testing failure in the flare/igniter assembly and was unrelated to the launcher or other components of the system. While the flares were sealed as a part of the manufacturing process, it appeared that excess moisture in the production environment may have caused the magnesium pellets in the igniters to oxidize to the point at which ignition of the grain was compromised. The Navy possessed several thousand flares from the manufacturing lot on hand. The operating procedures for problematic flares were to scrap or demilitarize them.

New flares could be produced, but that led to concerns of a long lead time, cost, and the environmental impact. The delay was highly undesirable for the Navy and, most important, did not support the warfighter as needed. The CAAA team re-examined the basic function of the flare (to burn intensely in the desired portion of the light spectrum) and devised a method for the flares to perform their basic function: deploy and burn to distract and confuse enemy detection and guidance systems. From the analyses, the team identified that the problem was not with the entire flare, and that the failure was isolated to the igniter.

## Creative Phase

As the team enters the creative phase, members must have a good understanding of the desired function and any issues, broken down to the most basic level of understanding. This phase is the time to unleash the inventive powers of a team and develop alternative approaches.

For the CAAA team, the typical solution would have been to accept that the materiel was in an unusable condition, scrap the lot, and move forward with new production; however, VE challenges people to move from the status quo and seek new alternatives. With finished goods, the cost and lead time of replacement products must be balanced against the expense and time of rework.

While the problem with the flares seemed fairly straightforward to resolve, the biggest challenge involved the sensitive energetic materials involved. Rework procedures for the replacement of the igniter didn't exist. A new approach to machining had to be developed to provide an economically viable alternative to new production while ensuring timeliness, quality, and safety. The new approach required the involvement of the customer's design agent, the engineering team, and production and safety personnel. It was crucial to have the right team assembled, the problem well defined, and clear goals established as a result of the earlier VE steps.

## Evaluation Phase

Now to bring the high-performing, outside-the-box-thinking team back to reality. In this phase, several potential concepts have been developed and must now be evaluated against the goals of the overall VE effort. For example, will the proposed solution meet customer requirements? Does it impact any other areas of the system (support, maintenance, training, etc.)? Overall cost of the proposed solutions must also be evaluated one more time in the framework of the total cost of ownership. If multiple solutions have been developed, the team must select the best few that warrant further study and development.

An early step in problem solving is to create a clear and concise statement of the problem. For VE, that includes having developed a clear understanding of the customer's needs in the functional analysis stage. Only with this communal appreciation can potential solutions be evaluated effectively.

For the CAAA team, focusing on the faulty igniters did not limit creativity; instead, it added clarity. The challenge was not a total redesign of the flare; rather, could the flare be disassembled and the faulty igniter replaced? Safety considerations were paramount, and the rework process had to yield consistent, high-quality results. CAAA had an excellent safety record as well as facilities that allowed for compartmentalization throughout the manufacturing process. That limited the risk and allowed those in the production environment to focus on each discrete operation and the quality of the solution. The team agreed that the solution was workable. The VE effort now changed from feasibility to economics.

## Development Phase

After narrowing the range of potential solutions to a select few, the next step is to answer the question "What will this cost?" for each proposed solution. If there are any technical or operational hurdles to be cleared, processes must be developed to address those as well. Implementation plans should consider all aspects of the solution, including personnel, equipment, training, and all associated costs. The team may split into smaller groups to expedite the process, working to validate proposed solutions and develop cost estimates.

The CAAA team required a new process to allow for quick breakdown of the flare and safe removal and replacement of the igniter. It soon became evident that new equipment was needed to ensure safety while allowing the operation to proceed at pace, which would keep cost and delivery schedules within reason. An implementation plan, including a cost estimate, was developed addressing the need to purchase new equipment if the solution were to be practical in the production environment. The team had full confidence that the solution was feasible and was the best path to fulfilling the warfighter's requirement. It was time to present the solution and request funding.

## Presentation Phase

In this phase, data are gathered and prepared to present in concise, factual fashion to the decision makers. To build the case for the proposed solution(s), thorough research is completed, developing the benefits and disadvantages of each course of action. Value studies detail the financial landscape. The presentation is designed to provide the decision makers a clear picture of the alternatives with the factual support necessary to make an informed assessment of the selected course of action.

Because the Navy design agent for the flares partnered with CAAA throughout the solution development process, the presentation phase was very straightforward. Cost estimates and procedures were reviewed and discussed with the benefits and risks involved. The bottom line became very clear—the flares could be reworked at a tremendous savings, delivering a reliable solution to the warfighter much more quickly than new production. The greatly reduced environmental impact was a side benefit that further enhanced the desirability of the refurbishment option.

## Implementation Phase

After receiving approval from the decision maker to proceed, a VE team most likely conducts a small trial as a proof of concept. Written reports, including the results of testing and any lessons learned, are incorporated into final documentation. The report, if the results are positive and support the proposed solution as expected, will greatly enhance the probability of final approval. At this point, the full implementation plan can be executed, and the organization reaps the benefits of the hard work.

The CAAA team felt very confident about the proposed solution to the flares problem. Thirty flares were reworked to validate the manufacturing process, allowing the team to look for areas of further improvement potential along with ensuring that safety protocols could be met throughout the procedure. The results of the small-scale test gave the Navy decision makers the confidence to fund a full test batch of 300 flares. From an unacceptably high initial failure rate, the 300 flares in the test performed without a single failure. The rework process proved safe, effective, and the best way to meet the Navy's need. NSWC provided funding to rework the flares, along with funding to purchase equipment that greatly improved the speed of the rework process.

## A Successful VE Effort

The CAAA and the NSWC–Crane teams received the fiscal 2008 Department of Defense VE Achievement Award and the Army Materiel Command Installation Award. The awards recognized the reduction of life cycle cost and increased reliability achievements. A total cost savings of about $7.8 million was realized while meeting the warfighter's needs.

Although the VE process is directed to be used throughout a system's life cycle, it is especially useful when presented with a situation in which conventional wisdom points to an expensive, time-consuming, or potentially wasteful process. The benefits can be truly remarkable, professionally satisfying, and, ultimately, very rewarding to the customers and those they support.

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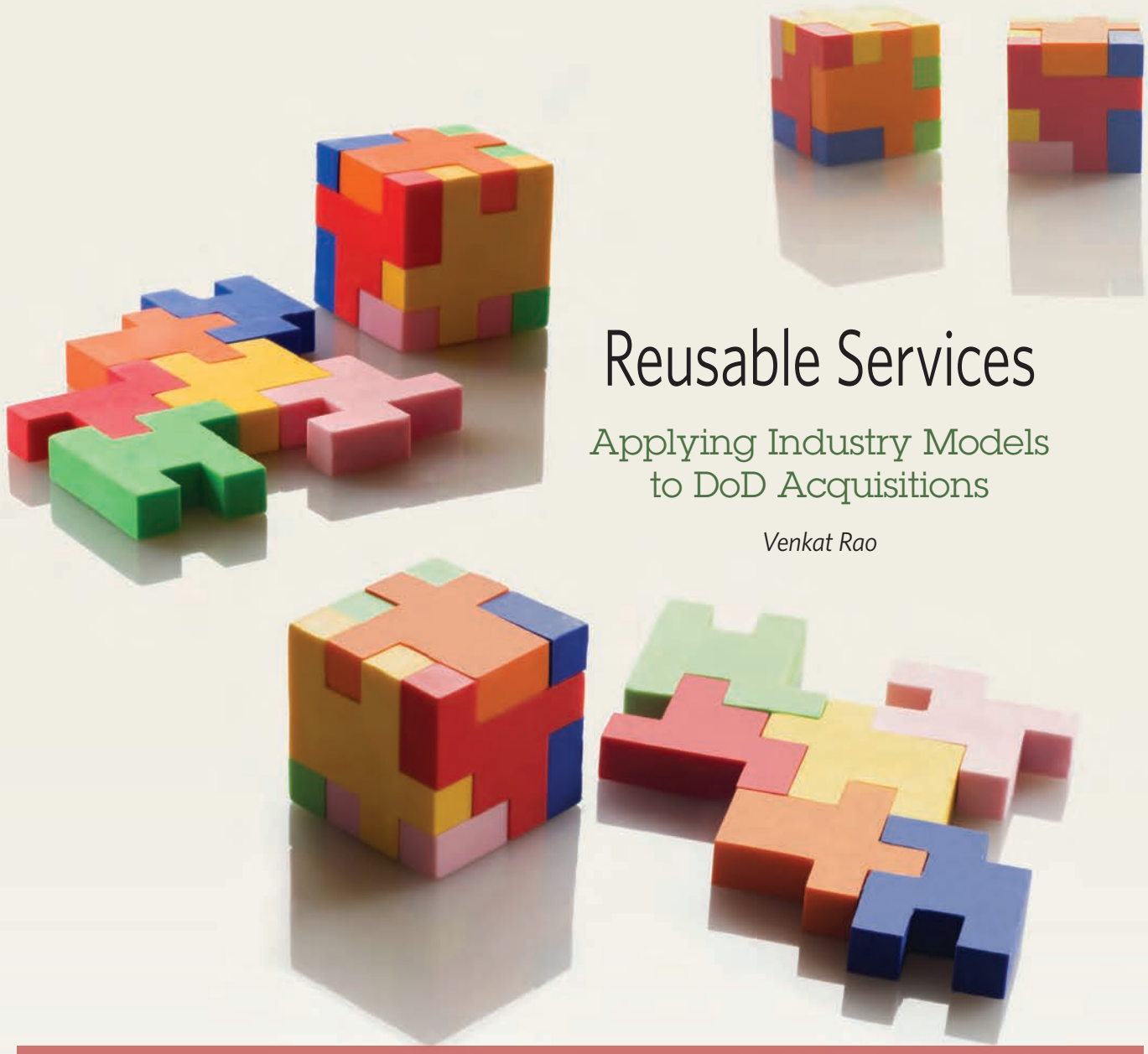
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# Reusable Services

## Applying Industry Models to DoD Acquisitions

*Venkat Rao*

Software and information technology service providers and Department of Defense acquisition programs face common problems and share common goals. The software and services industry must deliver solutions that meet customer needs cost effectively while providing a profit margin; and DoD programs need software solutions that meet cost, schedule, and performance objectives. The drive to achieve those goals has spurred process and development initiatives in industry and DoD, with each entity leveraging the advances in the other. This continuous search for improvement is as much a journey as a destination, as we examine new opportunities for improving the quality, cost, and timeliness of software capabilities.

### Trends in Software Product and Project Development

Software product and project development have always presented challenges for both industry and DoD software acquisition in meeting cost, schedule, and quality objectives. Organizations are in constant search of management systems that address these challenges. One shift industry has made to ensure high quality-product and project

deliverables is to emphasize the importance of the software development process and to rely on capability maturity model integration (CMMI) levels to measure software development organizations. Software development organizations have focused on repeatable processes, continuous improvement, and feedback systems to benchmark and improve their CMMI levels. Software acquisitions in weapons systems programs facing the same issues have leveraged the industry trends and have integrated the use of CMMI measures in software acquisitions and in the selection and evaluation of software development organizations.

A second critical aspect in improving software deliverables is requirements management. Changing requirements have long been recognized as a root cause of programs not meeting cost, schedule, and performance requirements, even as programs bravely attempt to resist requirements creep and struggle to identify valid requirements changes. Industry has responded to this issue by emphasizing robust requirements management with sophisticated tools and implementing rigorous configuration management of requirements. Traceability matrices are used to map software requirements to stakeholder requirements and systems functions. Traceability provides a mechanism of checks and balances to ensure requirements changes are evaluated critically and accepted with a complete analysis of their impact. The process is taken to the next step and extended further when systems development is based on coupling requirements management with the development of business- and system-use cases, again to efficiently and effectively manage the system development process.

The Defense Department has emphasized the same systems management principles in the systems engineering processes that govern weapons systems development. While DoD does not prescribe a process to external suppliers, weapons systems developers are evaluated on the use of documented industry standard systems engineering processes, with their effectiveness typically reflected in their past performance and deliverables.

The software industry business model was based on requiring a significant investment of research and development dollars in software products with the hope of delivering the same product many times, with minor customization for individual customers. This industry model appears to be restricted to large-infrastructure software capabilities in the realm of databases, enterprise applications, and, perhaps, the social networking platforms of the current era; and is dominated by a few large players. The need for and dream of mass customization of software products continue, however, driven by the mantra "build once and reuse and recombine many times," so as to deliver customized software business solutions that meet individual customers' unique needs.

This need and the mantra are now close to being realized with the third trend in the software industry of developing software as reusable services. The basic concept is to develop services that implement common functionality that can be reused by many software applications. An example is the creation of a service that authenticates users when they sign on to an application using smart cards and user-specific information. This service can be used when authenticating remote users in an application that supports remote access or in an application that supports users when they are present in person—a common service used in two applications. As new customers or new customer needs emerge, existing services can be recombined along with the development of new services to deliver customized solutions. The new services developed in a specific engagement are added to the pool of existing services and reused yet again in the next customer engagement. The advantages are obvious: development of new software on a specific engagement is minimized and limited to any new services required for the engagement. A unique customer solution to address the customer's specific problem is crafted using existing and new services. Thus, we see many software companies becoming services companies and using services to deliver customized solutions, a transformation made possible by this trend.

Over the years, this approach has been used in software development, but the difference this time has been the emergence of the Internet as the driving and governing force of industry standards for services. These standards have supported all aspects of software services development, including the use of communication protocols and the encapsulation of data. The approach is not intended to, and does not, eliminate the development of efficient algorithms or innovation in implementation; instead it allows the software development process to focus on precisely this innovation and the efficient use of technology and less on the rules governing the process.

## An Opportunity for DoD

DoD has recognized this trend towards services-oriented architecture and acknowledged it in the DoD Architecture Framework as a key tenet of DoD's Net-Centric Data strategy. A conceptual approach to how DoD can leverage the development and reuse of services not only in weapons systems acquisition but in all automated information systems acquisitions is outlined here. The first step in the process is the identification of required services. This step would involve reviewing the DoD architecture framework, net-ready key performance parameters, and other sources of common software requirements to develop a set of generally accepted software services that have been or will be used in DoD programs. It would also require the development of a common services development framework (CSDF) that would be applicable to DoD software development and software acquisitions. The next step would be to identify software capabilities for which DoD has acquired data rights and to review those capabilities in order to develop a library of services that could be reused for planned software capabilities. The library of services might need to be re-engineered to adhere to the CSDF. The initial set of services could include standard integration services between major information backbone networks currently implemented in DoD. The



**The need for and dream of mass customization of software products continue, driven by the mantra "build once and reuse and recombine many times."**

CSDF would be a published framework for software suppliers and industry to use in responding to DoD requirements. Over time, the framework could migrate to be accepted as an industry standard and managed using industry standards groups.

The next step would be to expand the initial library of services with additional or new services required by DoD acquisitions. The process would require that DoD solicitations include the library of services that suppliers could access to develop their responses. This library of services would be made available to suppliers (with limited data rights to protect DoD intellectual property). Suppliers would also have access to the CSDF, and their responses should identify the new services that are included in their proposal. DoD would also acquire data rights to the new services, and those services would be added to the library of services. The logical extension of the model is a robust, growing set of services that could be reused for future acquisitions across the DoD enterprise.

The benefits of the approach described above would be significant. The cost of new software development would be reduced over time as the library of services grew and services were reused. Additional benefits would be gained in reduced test effort as services previously tested required less test effort in future implementations. The quality of the resultant software capability would be higher as the percentage of tested and proven services increased in the delivered capability. A life cycle benefit would be reduced support costs because the system would be built around services currently supported and new development would be minimized. The net result should be a lower-cost, higher-quality capability that meets desired time frames.

## Meeting DoD's Unique Requirements

DoD has unique requirements. Foremost are security requirements, and there are several approaches that can be evaluated to ensure DoD systems remain well protected. The specific algorithms and methods to protect data would not be exposed to external suppliers. All of the mechanisms currently in place to protect secure data would continue to be applied in shared services implementations. The library of services provided to suppliers during solicitations would exclude targeted security services; however, those services would be provided to suppliers once they had been selected, and the current strict guidelines that are used to share secure information with external suppliers would continue to be enforced. Another approach could require the development and support of security services to be under the purview of DoD software development organizations. The services could be made available as government-furnished software "black box" modules. External entities would have no access to the content or implementation of those services—integration testing could be restricted to DoD organizations.

Another important aspect of services-based solutions—and even more so in DoD systems—is system performance. Services implementations generally require robust networks and system resources to achieve the required performance; DoD systems are developed with high-performance requirements and around a robust infrastructure. This core competence in high-performance systems positions DoD to take a leadership role in optimizing services implementations for improved performance and transfering the knowledge to industry, thereby continuing the symbiotic relationship between industry and DoD.

The DoD acquisition framework has provided the blueprint for systems development and delivery of high-performance systems that need to be sustained for many years. Driven by market necessities, industry has been agile in improving processes and moving software development technologies forward. The two paths have intersected and leveraged the best practices of both in the search for cost-effective, best-of-breed solutions. The journey continues as services-based implementation opportunities are explored for integration into DoD systems development.

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# Coach Your Team

*Wayne Turk*




Many of us have played on an athletic team at some time or another, and while on that team, we had a coach who helped us progress and improve our skills. As a PM, it is part of your job to do something similar for your project team. Coaching employees and mentoring them are related, but they are not the same activities, even though some writers and managers use the terms almost interchangeably.

## What is Coaching?

Coaching is "a process that enables learning and development to occur and thus performance to improve," says Eric Parsloe in *The Manager as Coach and Mentor.* He goes on to say that "to be a successful coach requires a knowledge and understanding of process as well as the variety of styles, skills and techniques that are appropriate to the context in which the coaching takes place."

According to Daniel Tobin, author of *Coaching and Mentoring*, "the coach is … a tutor, observing your work and actions, providing comments on execution, and teaching skills which may be lacking."

While this article focuses on the PM as coach, there is also the trainer as coach. The trainer can be another team member or a professional trainer. He or she can be a peer or even a subordinate. The duties of a trainer are more limited, though, focusing on a specific skill. So a team member may have multiple trainers at the same time or over a period of time. As PM, your coaching responsibilities are much greater and cover a much broader area.

- Managers coach their people as a part of their job, although a training coach can come from another functional area.
- Coaching takes place within the formal manager-employee or trainer-trainee relationship.
- It usually occurs in the workplace or an environment designated for training.
- The focus of coaching is to develop individuals within their current job—to increase specific skills, knowledge, or understanding they need to fulfill their duties.
- Managers tend to initiate and drive the relationship; this is true even in the trainer-trainee situation.
- The coaching relationship may last a long time; but it is finite, ending when an employee has learned what was being taught—though it can, of course, continue for new skills.
- Managers have wider responsibilities as a coach than others.

## Your Coaching Duties

As a manager of any kind, you should always be a coach for your employees. Giving them your time and attention helps each of you understand the other. It helps clearly define the expectations that you have for each person. Adopting coaching as a part of your duties allows you to help other people unlock their potential and enhance their performance. You're helping them learn instead of just feeding them the answers. Your mindset should be to create an environment that fosters learning, independent thinking, increased skills, and the desire to become a better asset to the project and the organization. Your responsibility can be seen as facilitating, paving the way for your people to achieve better results and move up in the organization. Provided that you are not the yelling/screaming kind of coach (think Bobby Knight!), you are also showing respect for their individual capabilities and providing the opportunity for self-development. That's both motivating for the person being coached and rewarding for the coach.

I need to clarify something here. Don't look at coaching as just training someone to do something, like teaching someone to work a spreadsheet or handle a specific piece of software. It may include such specific tasks, but it is much more. Ensuring the incorporation of new skills and knowledge into the person's work repertoire takes time, practice, and feedback. That is a portion of the coaching aspect of the manager's job. The coach observes and critiques performance and provides feedback on the employee's ongoing development of skills. More on feedback later.

Coaching your people can help them to understand the organization's mission, vision, and goals, as well as the project's. It also can give them a better understanding of the organizational culture. Clear communication and understanding of these things result in employees who feel more connected to the organization. Having a good communications flow makes it easier for managers and employees alike.

Coaching involves asking questions. The intention shouldn't be to embarrass employees, but to help them learn something about the job; to ensure they understand policies; to teach them a problem-solving process; and to help you understand what they know, believe, or need. Asking questions (and truly listening to the answers) may be more challenging than just giving them information, but it results in a better team.

Coaching also involves answering questions. PMs are busy people, but even so, they must make time to respond thoughtfully to a team member's question. There are times when all that is needed is a quick answer; other questions may call for more effort and time to give a response. Brushing off the questions or giving perfunctory answers now may cause us to miss out on valuable information or to create problems that could have been avoided. Remember that providing good information, support, and encouragement is an investment in a better team and improved productivity.

Your final duty as a coach is career development of your people. Managers who take an interest and try to help team members progress have highly motivated and productive teams and usually successful projects. The consequences of not addressing career issues can result in lower productivity, low morale, problems, conflicts, and eventually, turnover. Ask people about their aspirations. Whenever possible, assign them work that fits with their career plan. It won't always be possible, but try.

## Feedback: The Essential Element

As a part of coaching, you need to give your people feedback. None of us can improve our work and grow our skills if we don't know what we're doing right and wrong or what is expected of us. Here are a few suggestions on providing feedback. They apply any time, not just for coaching.

- Give feedback on a regular basis and whenever a specific occurrence requires it. If something happens (good or bad) that you want to talk about, give feedback as soon as possible after the event.
- Try to always begin with strengths and what people are doing well before moving on to areas for improvement or growth. People usually do want to know where and what they are doing poorly as well as what they are doing well,




so don't be afraid of giving negative feedback; just make sure it is appropriate, constructive, and correct and that whenever possible, you combine it with positive comments.

- If a person is underperforming or doing something wrong, be specific, factual, unemotional, and direct your comments at performance. Don't make comments that attack the person, just the performance.
- Make sure that your feedback is relevant to their duties and the areas of growth that you want them to attain. Restrict comments to things that are a part of their job and affect their performance or career development.
- Ask people's opinion, and listen to their views of any problems. Team members can often suggest how to deal with their own performance issues, including how you can be most helpful. They may also have suggestions for other improvements.
- Remember why you're giving feedback: You are coaching people to improve performance and enhance their career development. Keep goals (and corrections) realistic; don't ask for the impossible from your people.
- Follow up and reinforce after the meeting. Recognize and praise improvement, or provide course corrections while praising current efforts.

## It's All About the Results

### *Decreased Turnover*

Employee turnover is an expensive proposition, involving search and hiring costs, training costs, and less productivity as new hires come up to speed. Studies by the American Management Association and others report a range between 25 percent and 250 percent of annual salary per exiting employee as the cost of replacement. Good coaching helps prevent expensive turnover. Surveys show that employees remain with organizations when: work is interesting and challenging; they are well-informed about organizational goals; they are recognized for good performance; and opportunities exist for their professional development. For example, a study in 2001 involving some 20,000 exit interviews found that the number one reason people leave jobs is "poor supervisory behavior." And one of the factors in poor supervisory behavior was lack of coaching. Another study from the healthcare industry showed that 54 percent of respondents credited coaching as a significant factor in their satisfaction with the job and a reason that they were staying. Managerial skills such as listening, observing, giving constructive feedback, providing recognition, and teaching new skills are an integral part of your coaching job and they help prevent turnover.

### *Improved Morale*

Improved morale is another result. Your people know that you care about them, and this motivates them. One study from 1999–2003 showed that 60 percent of employees say they feel ignored or taken for granted. Another later study showed that that 65 percent of respondents cited not "feeling valued" or "insufficient recognition or reward" for leaving previous employer. That is the negative side and shows low morale. Most studies show coaching increases morale.

### *Higher Productivity*

Employees who know their job, understand the organization, and know where they fit, care more and want to do a good job. They want the project and the organization to succeed. Michigan-based Triad Performance Technologies, Inc., studied and evaluated the impact of coaching support on 67 regional and district sales managers within the telecom environment. Positive results were achieved in several key areas, which led to an estimated $2 million profitability impact from the group receiving the coaching. Here's another example: A recent study cited in the *Public Personnel Management Journal* found that the typical management training program increases a manager's productivity by a respectable 22 percent, but when combined with eight weeks of one-to-one coaching, the manager's productivity skyrocketed to more than 85 percent. Those are impressive statistics.

## Success Breeds Success

PMs frequently get rewarded or recognized for task completion more than for coaching, motivating, and developing their people. That is shortsighted on the part of the organization. One measure of success for a manager is the success of the people that work for him or her. Coaching your employees will improve your team and make you a better manager and a more valuable organizational asset. This can only help your career progress as well as theirs.

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# Buying Tools for Fighting Teams

## A Story with a Happy Ending: Part II

*Col. Brian Shimel, USAF*

Dear Reader, this story began in the November–December 2010 issue of *Defense AT&L*. I told you how, in a land so much like our own nobody could tell them apart, a Small Elite Amphibious Fighting Team (SEAFT) realized they had a problem, a problem they thought could be solved by a new portable radar. Unfortunately, the radar cost so much that they had to abandon their idea. But fortunately, another of the nation's fighting teams, the Above Low Objects Fighting Team (ALOFT), had noticed the new radar development and coveted it. The SEAFT was happy to share with the ALOFT the information and cost estimates they'd gathered. The ALOFT had a bigger budget, so they continued the development of the radar, creating

vital charts to help them negotiate the many offices of necessary supervision and review. But as the ALOFT gained more information about the radar, it became clear that it was going to cost more than they'd planned to spend. We left our hero—the ALOFT's tool buyer—grappling with the problem. We rejoin him as he attempts to work out a solution.

The tool buyer had been thinking very hard how to solve his problem. When the project started out, he had the data from the SEAFT, and he had solicited opinions from expert tool buyers from the private sector. Maybe the tool buyers weren't completely objective, but they were very experienced and would be bidding on the chance to build the radar; so it had been a good idea to ask their opinion. And it had also been a good idea to follow up by asking his own staff to confirm the private sector's experienced experts' estimate, even though the staff came up with a different answer. So over a period of a couple of years, he had come up with three answers: (1) the SEAFT's original estimate, based on incomplete data; (2) the estimates from the private sector, bid to fit within the available budget; and (3) an independent, objective estimate using reliable assumptions and the latest methodology that resulted in a much higher estimate than he could afford. It was a true dilemma for a tool buyer! What was he going to do?

**It seemed the more anyone learned about building the new radar, the more expensive and difficult it appeared to be. Clearly it was going to be very hard to get permission to build it.**

It seemed the more anyone learned about building the new radar, the more expensive and difficult it appeared to be. Clearly it was going to be very hard to get permission to build it. So the professional tool buyer came up with an idea and sent it up through the many, many layers of important offices of necessary supervision and review—and in this case, I have to say that they did their job.

## When One and One Makes … One

The tool buyer's idea was to get his boss's boss's boss to tell his boss (a person who had the authority to make important decisions about really expensive tools) that the radar was estimated first by the SEAFT and second by the tool buyer's staff, and not to mention the request for information estimate from the private sector. He decided to say he'd like to take the average of those two estimates as the official value of the radar development through the next kilometerstone. (One way you could tell this country apart from ours, however alike they were in other ways, was that it had wisely converted to the metric system because it was so much simpler.) A kilometerstone review required any tool-buying program to be approved by the ALOFT chief tool buyer or a very important deputy before it could go forward to the next kilometerstone to spend more money. If the program were a little cheaper, the tool buyer reasoned, it could be reviewed by someone lower in the tool-buying decision chain of command; so getting an approval to treat the new radar as a cheaper program had a big advantage of time and understanding (but usually no fewer vital charts).

As you probably know, an estimate is an informed and educated guess that is improved with more information and education. For the tool buyer to suggest that there were two estimates would be to forget, for the sake of convenience, that the first estimate (done by the SEAFT) had been done a very long time ago, with little information or understanding about developing the new radar; and the second government estimate was recent, with greatly improved information and analysis. One of the many, many layers of necessary offices of supervision and review actually read the supporting documentation and came to a logical conclusion.

That office told the professional tool buyer, "No! You do not have two estimates; you have *one* estimate."

## Making a Decision Based on Evidence

Now that stung a bit. The buyer chafed and vented to his friends, then eventually went back to thinking. And the thoughts he thought! What he ended up thinking was that his trouble was caused by an estimate that was too high. So if nobody believed the estimate with the best information and analysis, perhaps he could win approval for the amount of money to develop the new radar from the estimates provided by the private sector. So he built a chart. It was a good chart with lots of colors. It explained the possibility that the actual amount of research, development, test, and evaluation money it would take to develop the new radar would be at or less than a certain figure. The evaluation of that possibility was done by his expert estimating staff. Ironically, although our hero built this vital chart using the very probability profile his own government estimators created, his purpose was to discredit the estimate it was based on! He thought that by comparing the very high current estimate to the earlier estimates, it would look so much more expensive that nobody could possibly think the new radar would take so much research, development, test, and evaluation money to develop!

The professional tool buyer unleashed the chart on his critics! And it was powerful. It was so powerful that everyone who saw it—that is, everyone who didn't already think they knew the answer—immediately recognized that the original SEAFT

estimate didn't have the best information and couldn't possibly be right anymore; and the private sector contractor requests for information were clearly based on an over-eager desire to fit into a predetermined budget limit. Neither of the first two estimates explained the true amount of effort, risk, and uncertainty involved in developing the new radar.

The only reasonable, responsible course of action was to accept the most current, objective, and informed estimate as the basis from which to make a decision.

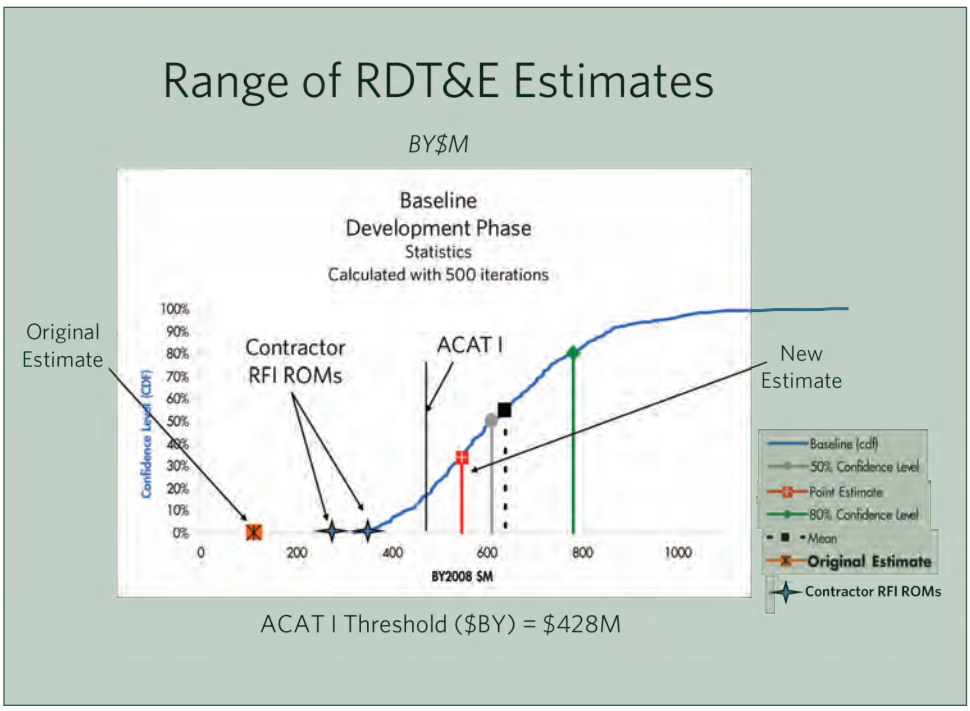
## Not Just Having a Process but Using It, Too

If you think back to how the SEAFT developed their original estimate, you will remember they weren't at all sure of how much work needed to be done. The ALOFT, on the other hand, were able to spend more time and learn much more about the work that needed to be accomplished. That explains the large difference between the original $150 million research, development, test, and evaluation estimate prepared by the SEAFT and the 80 percent confidence level estimate of nearly $800 million prepared by the ALOFT cost analysts, which you can see illustrated in the chart below. It wasn't, and never had been, because the estimates disagreed with each other. The difference occurred over time because people learned more about the elements that made up the new radar. It was a natural growth.

It's not cause for suspicion but for recognition that as time goes on, more will be known about a project effort; there will be less risk and uncertainty; and the answer will become more clear and defined. It doesn't mean the final cost at completion will be less or any different at all. It means we will have more knowledge about the answer; be more certain about it; and we will make a better prediction that will be more likely to hold up through the design, development, production, and integration processes.

The proposals made by the defense contractors from the private sector in the request for information were made before the ALOFT engineers and analysts did much of their work. So they were based on more evidence than the SEAFT had, but not as much as the ALOFT had. The defense contractors also had the extra information of how much money the ALOFT had available to spend on the radar development. Naturally, nobody was really willing to say how that information helped them build their estimate, as it didn't help explain anything that was needed to build a new radar, except maybe how many people they could hire at one time.

In exasperation, the professional tool buyer gave up trying to convince his boss's boss's boss that the new estimate was unrealistic. He added a two-year $50 million technology demonstration phase (a subset of the research, development, test, and evaluation phase) to his schedule. He planned to do cost comparison studies, trade-off analyses, and technology maturity work to reduce the risk, uncertainty, and overall cost associated with developing the new radar. He briefed this planned effort—now much longer than expected—to his boss's boss's boss. He even invited the SEAFT to talk about what they knew about the new radar and how much they needed it to continue defeating their nation's enemies. The decision-making boss was completely satisfied and congratulated the professional tool buyer on his achievement of correctly identifying the best analysis and best possible course of action to develop the new radar for the ALOFT.




"This is exactly the right way to do this work. It is exactly what the many, many layers of important offices of necessary supervision and review were asking you to do. They should be thrilled!" said his boss's boss's boss. And they were. The professional tool buyer accepted the praise and looked very determined to get the cost of the radar down, if it was the last thing he ever did! And maybe he will ....

**Shimel** *is chief, financial analysis division, financial management; and comptroller, Air Force Space Command, Peterson AFB. He manages an annual budget of approximately $12 billion supporting 40,000 personnel. The author welcomes comments and questions and can be contacted at* **brian.shimel@peterson.af.mil**.

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# The Four Questions

## A Structured Brainstorming Approach

*David M. Riel*



A couple of years ago, when I was employed by one of the Department of Defense's industry partners and managing the organization's continuous improvement activities, we were struggling with how to get the most productive output from our yearly operations offsite. I'm confident that if you've been in the defense business for any length of time, you've participated in an end- (or beginning-) of-year offsite to set goals for the upcoming year. In fact, during my U.S. Air Force career, I attended and/or led a number of such events with either an all-government or a mixed government/contractor team. While the events were always beneficial, we would typically lose focus at some point and go off on a tangent.

The same thing happened repeatedly with the industry operations leadership team of which I was a member. During the course of our offsite, we'd make some strides; however, inevitably, we'd march down some unintended road. Follow-through on those areas we did address was also lacking—much like following up on my many well-intentioned New Year's resolutions. It was in this environment that a colleague and I, along with our supervisor, stumbled upon what we ended up calling the Four Questions approach. It was nothing magical, just a nicely structured approach to brainstorming that, with proper facilitation, kept our team focused. It actually took its roots from an excellent book we were all reading on the importance of trust in an organization, *The Speed of Trust*, by Stephen M. R. Covey, which lists a version of the four questions in the section on trust-building behaviors. What follows



is an outline of the five stages of the Four Questions approach, which can help structure your team's ideas/brainstorming sessions.

### Stage 1—Pre-Event Survey

As the continuous improvement gurus teach us, the best ideas usually come from the people closest to the work. So prior to the event, whether it was an end-of-year off-site or a skip-level meeting (which means a meeting with the workers' boss's boss—you "skip" the next-level supervisor), we'd ask the attendees to anonymously fill out a survey asking these four basic continuous improvement questions:

- What should we stop doing (to eliminate waste)?
- What should we start doing (to add value)?
- What should we continue doing? (What are we doing well now?)
- What would it take for us to be the best? (This question was to encourage big thoughts.)

This is where a facilitator can really pay off. Without bias (or, perhaps more important, without any perceived bias), that individual can organize and consolidate the survey responses prior to the event. The facilitator can also ensure that the inputs remain anonymous. In addition, he can facilitate the actual event and record the results—providing a product that can lead to better follow-through.

After participating, facilitating, or leading a number of such events, with participation ranging from six to 20-plus employees, I have found that the responses can typically be consolidated into six or fewer discrete notions for each of the four questions, although the notions vary from team to team.

**During the course of our offsite, we'd make some strides; however, inevitably, we'd march down some unintended road.**

## Stage 2—Clarification

At the actual event—whether it be an offsite, skip-level meeting, or similar event—all participants should review each question's responses, including consolidations the facilitator has made before the event. Participants need to understand and agree upon what each response means, and all ambiguities need to be clarified prior to moving on to the next stage. For example, at a skip-level meeting at a manufacturing facility, one of the discussion topics was how to provide better tools. Participants needed to determine exactly what tools needed to be better. Was the survey response referring to simple hand tools, which are relatively inexpensive, or major capital equipment, which would require an extensive budgeting process? In order to get a fair assessment from the team, knowledge of the ballpark cost was very beneficial.

After each response has been clarified, and combined where appropriate, the facilitator adheres them to a wall under the appropriate question (start, stop, continue, be the best) in preparation for the next stage.

## Stage 3—The Multi-Vote

There are many variations of multi-voting; however, it is usually a process in which each attendee is given two or more votes to be distributed among several alternatives. In our industry offsite, we multi-voted by giving each participant two to three votes per category, dependent on the number of attendees we had. (We color-coded the responses for the four questions to ensure the voting was distributed equally among the categories.) Typically, people are allowed to allocate their votes as they see fit. Within each category, they may vote for their top choice with all three votes or distribute them among three different ideas.

Multi-voting allows for the broad range of ideas to be further refined, with the leading vote-winners receiving more focused attention. That's not to say all the other ideas should be discarded; however, only those lower-ranked ideas that require few or no resources and have no unintended negative consequences are given the opportunity to be implemented. The strength of the multi-voting process is that it quickly engages all the attendees and doesn't allow for one particular attendee (or the boss) to dominate the process. While the participants are on a break, the facilitator can tally the votes and present the results when everyone returns.

## Stage 4—Focused Discussion/Action Plan

In this stage, the ideas have been narrowed and prioritized through the multi-voting process, and the team can concentrate on the top vote-getters—those ideas that the participants think have the most merit or that they care about the most. That's not to say that all the ideas that receive the most votes can be implemented. Sometimes the resources required or policies in place won't allow for implementation; however, at a minimum, it allows leadership to address concerns and explain why a particular idea cannot be employed. For example, we used the Four Questions technique for a skip-level meeting with a paint hangar team that fell under my responsibilities when I was with industry. Their number-one vote-getter was "better raises and more promotions." I was able to explain to them the promotion and raise process, and show them in general terms how their organization actually did well in both areas based on the dollars allocated to our facility by the corporation—and all based on their superior performance during the past year. While they weren't thrilled that no additional raises or promotions were coming their way, they could see that based upon what I had to work with, they had received their fair share in accordance with their collective performance. If not for the session with the team, I wouldn't have known about their concerns in that area and wouldn't have taken the time to explain to them the process. As a result, communications increased, and I had a better understanding of a potential morale issue.

One area we could tackle was the second-place vote-getter: "look into better sealant." It seemed that the paint hangar team was having mixing and curing problems with the sealant they had been using for years. Through the clarification and focused discussion portion of our Four Questions session, we were able to determine exactly what their issues were and put an action plan in place to solve them.

As with any good action plan, you need a responsible person (actionee) and a suspense date. One of the team members in the session, the paint hangar team lead, agreed to take action on the sealant, and we settled on a suspense date. We also agreed to not make changes to the sealant until we clarified any unintended consequences from switching sealants, including incurring additional cost.

We pursued similar discussions on the top two to three vote-getters in each category, and we reviewed the rest quickly to see if we had any JDIs (just do it's) in the group. Because we had previously distributed and collected the surveys in advance, the entire Four Questions session with the paint hangar took about two hours. In contrast, we used the Four Questions approach with our annual operations leadership offsite—an

**The Four Questions approach brings structure and focus to what can sometimes be a chaotic process—a process that can easily get tangential.**

all-day event—with more in-depth conversations and detailed exploration of potential unintended consequences.

### Stage 5—Follow-Through

For this approach (or any approach involving brainstorming and employee participation) to be successful, it is critical to get the participants back together and provide the team feedback on progress made and ideas implemented. A session should be planned for after the last suspense date. If you don't get the team together and/or don't follow through on the implementation, word will spread that the events are a waste of time, and participant engagement will suffer.

For the operations leadership team, follow-through was easy because we had scheduled weekly meetings; however, we also scheduled a monthly two- to three-hour review of any initiatives resulting from our offsite to track status and ensure completion. We weren't perfect, but it did prove effective. For the skip-level meetings, like the one with the paint hangar team, we brought the team back together three months later to review our progress and demonstrate leadership commitment to executing their ideas. We also discussed any failed implementation, providing solid rationale for why we couldn't follow through (such as current budget realities not allowing for implementation).

### It Doesn't Take Magic

After reading this article, you are probably thinking, "Hey, this is nothing magical!" Yes, you're right! That's the beauty of it. The method brings structure and focus to what can sometimes be a chaotic process—a process that can easily get tangential. Why not give the Four Questions approach a try? Perhaps you can use it for your goal-setting offsite, or to tackle a particular issue with your contractor team.

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*After a 20-year U.S. Air Force career and several years working with industry,* **Riel** *joined DAU as a professor of program management. Riel is happy to provide further examples, sample formats, and facilitation advice. The author welcomes comments and questions and can be contacted at* **david.riel@dau.mil**.




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# Defense AT&L

# Writer's Guidelines in Brief

## Purpose

*Defense AT&L* is a bi-monthly magazine published by DAU Press, Defense Acquisition University, for senior military personnel, civilians, defense contractors, and defense industry professionals in program management and the acquisition, technology, and logistics workforce. The magazine provides information on policies, trends, events, and current thinking regarding program management and the acquisition, technology, and logistics workforce.

## Submission Procedures

Submit articles by e-mail to datl(at)dau.mil or on disk to: DAU Press, ATTN: Managing Editor, 9820 Belvoir Rd., Suite 3, Fort Belvoir VA 22060-5565. Submissions must include the author's name, mailing address, office phone number, e-mail address, and fax number.

Receipt of your submission will be acknowledged in five working days. You will be notified of our publication decision in two to three weeks.

## Deadlines

| Issue | Author Deadline |
|---|---|
| January-February | 1 October |
| March-April | 1 December |
| May-June | 1 February |
| July-August | 1 April |
| September-October | 1 June |
| November-December | 1 August |

If the magazine fills before the author deadline, submissions are considered for the following issue.

## Audience

*Defense AT&L* readers are mainly acquisition professionals serving in career positions covered by the Defense Acquisition Workforce Improvement Act (DAWIA) or industry equivalent.

## Style

*Defense AT&L* prints feature stories focusing on real people and events. The magazine also seeks articles that reflect your experiences and observations rather than pages of researched information.

The magazine does not print academic papers; fact sheets; technical papers; white papers; or articles with footnotes, endnotes, or references. Manuscripts meeting any of those criteria are more suited to DAU's journal, *Acquisition Research Journal (ARJ).*

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Articles should be 1,500 – 2,500 words.

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